

The Inventive Age

AND INDUSTRIAL RECORD

A JOURNAL OF MANUFACTURING INDUSTRY
AND SCIENTIFIC PROGRESS

SIXTEEN PAGES.

WASHINGTON, D. C., JANUARY, 1894.

ONE DOLLAR PER ANNUM.

The Two Great Glories of the Greatest Show on Earth.

Now that the World's Fair is over, one naturally pauses to reflect upon its wonders. The question is very often asked, "What was the most imposing and striking sight of the fair? There is but one answer to this: 'The great White City itself.' But what was the most telling and wonderful exhibit? This can be answered with equal promptness. 'The Edison Electrical Tower and the MacMonnies statue, with its adjoining fountains when illuminated at night.' We give on this page handsome sketches of these two most brilliant features of the great Fair because they are recognized generally as the best of all the marvelous things that were shown to the world during the exposition. The Edison Tower with its changing colored electric light was so fascinating to the mass of humanity that was constantly collected about it that it seemed to hold a spell over the minds of men. It is even said that some persons gazed so intently and so long upon this magic display of colored lights ever changing like rivulets on the sea, that they actually became dazed and daft, and were taken away to their abiding places by the Columbian Guards. Certainly the general effect of this flood of colored wire light has not been paralleled in the history of all exhibition. The millions who witnessed the weird and the startling effect of the illumination of the MacMonnies Fountain are practically unanimous in claiming that the impressions of the grand scene are more lasting than any other made upon them during the great Exhibition.

These were the two great glories of the greatest show on the earth.

process of obtaining color photographs and the recent modifications and improvements of Valenta, Lumiere, and others. The process has been given, and the results shown before the recent Photographic Congress of the Photographic Society of Great Britain. Mr. Varneke describes the process as follows:

sition as to be almost transparent. The sensitiveness of the plate was increased by immersion in a bath of silver nitrate, and dried. The plate was inserted in the camera, glass side towards the lens, and the film in contact with the mercury. The projected rays of light were thus met by the rays reflected from the mercury, and the

on a screen by means of a beam of electric light, and caused considerable sensation. Although the red was defective, the colors were, without doubt, very similar to the natural ones.

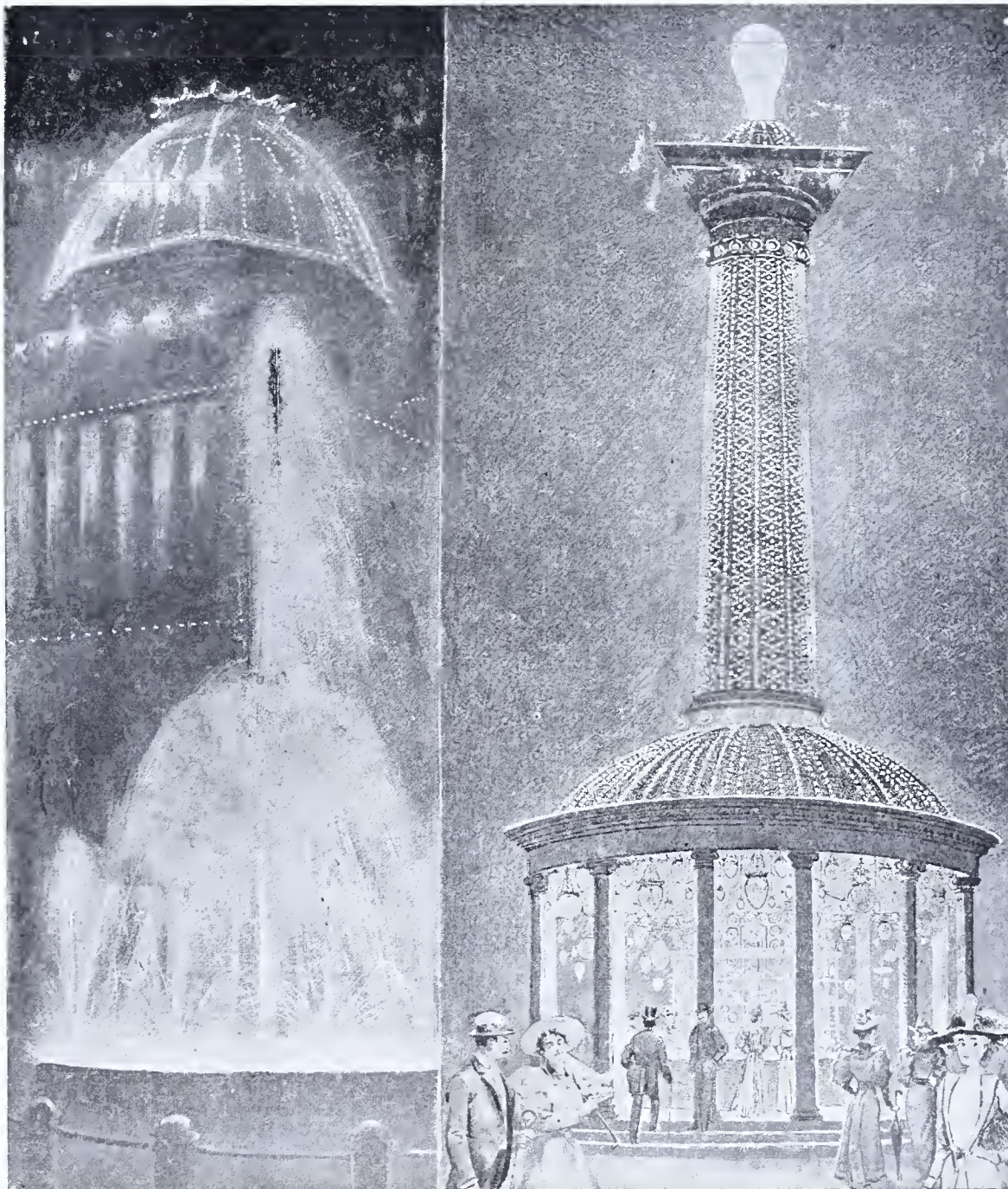
Taken as a discovery, it is one the most important of the nineteenth century, but there must be many improvements made

before it can be of any practical utility. The exposure, though now reduced to about four hours, is so long as to make it impossible to photograph but few subjects. Then if we desire to hang such pictures in our room, it would be necessary to have a special light arrangement to see them by. Now that the process has been made public, improvements should follow rapidly, and it is not utterly impossible that the wild dream of the photographer, since the days of Niepce, will be realized, and we shall be able to photograph, with all the transcendent beauties of color effect, the glorious sunset, a rainbow, and nature herself.

Decline in the Consumption of Liquor.

Statistics are presented in Dr. Gould's report showing that since 1874, when the retail trade was accorded to the Gothenburg Brandy Company, the consumption of liquor has steadily declined in its district. In 1875 the consumption per inhabitant at bar trade places was 11 3-10 quarts per annum. In 1882 it was 5 1-10 quarts. In like manner the brandy bought at retail places fell from 15 3-10 quarts in 1875 to 8 1-10 quarts in 1892. The higher grade spirits also show a diminution. In 1872 the consumption was 2 2-5 quarts, in 1892, 1-10. The quarts per inhabitant was 29 in 1875; seventeen years later it reached low water mark at 14 3-10 quarts.

During this period the prices of liquor advanced from 1 1/2 cents for a glass of brandy containing 47 per cent alcohol to 2 1/2 cents for a glass containing 44 per cent. These statistics do not include the amount disposed of by sub licenses.



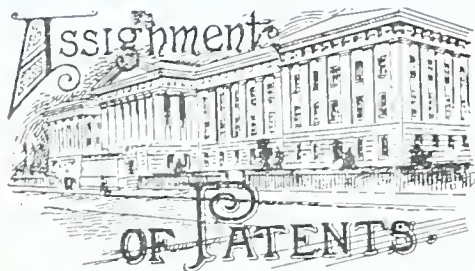
The Dream of Color Photography Still Vivid.

We have constantly deplored the want of reliable information regarding Lippman's

Two years ago, Mr. Lippman succeeded in producing an image of the solar spectrum in its true colors. This was done by a gelatino-bromide plate, so weak in its compo-

phenomena of interference—upon which the whole process is based—was produced.

Six examples were shown from nature, and one from chromolithograph, reflected



John C. Reuter inventor, to John C. Edwards, Motors by means of springs, one-eighth in his right, title and interest in said invention.

Consideration \$3,000

John M. Ewen inventor, to John M. Ewen, of Evanston, Ill., Process of Duplicating Architectural and Similar Drawings. All his right, title and interest in said invention.

Consideration \$4,000

Mathew F. Connett inventor, to Emma G. Leake, of Florence, Col., Hand Fence Machine. An undivided one-third of his right, title and interest for three states and two territories.

Consideration, \$5,000

Elmer E. Chaudler inventor, to Orlando Parsell, of Genesee Co., Mich., Weighing Machine. All his right, title and interest in said invention for the United States, except two states.

Consideration \$5,000

Samuel E. Rote and Levi K. Landis to Armstrong, Brother & Co., of Pittsburgh, Pa., Cork Cutting Machines. Entire right, title and interest in said invention.

Consideration \$5,000

Robert Rose inventor, to W. W. Hall and others, of Hawarden, Iowa, Furnace Grates and Grates for Fire Engines. Gives his entire right in said invention.

Consideration \$5,000

Wm. H. Belts inventor, Model Mop Pail and Wringer Co., to J. A. White, of Chicago, Ill., Mop Wringer. All the right, title and interest in said invention for the state of Wisconsin.

Consideration \$5,500

Joseph Bingaman inventor, G. W. Stinebaugh to Joseph L. Hawkins, of Ottawa, Kans., Pruning Implement. One-third of their right, title and interest to manufacturing use and sell for the United States.

Consideration \$6,000

Henry Bornstein inventor, to the United States Vise and Pipe Wrench Co., of Chicago, Ill., Wrenches. All his right, title and interest in said invention.

Consideration \$9,000

Chas. M. Berry inventor, to Ellsworth D. Middlekauff, of San Francisco, Cal., Bracket for Incandescent Lights. All his right, title and interest in said invention.

Consideration \$10,000

Wm. C. Briggs inventor, to the Winston Cigarette Co., of North Carolina, Cigarette Machines. Exclusive right, title and interest in said invention.

Consideration \$10,000

Thos. Carroll inventor, to the Hubinger Carroll Cash Register Co., of New Haven, Conn., Cash Registers. All his right, title and interest in said invention.

Consideration \$10,000

Henry Robinson inventor, to H. Clay Rees, of Dublin, Texas, Automizers. All his right, title and interest in said invention.

Consideration \$15,000

Geo. N. Cleveland inventor, to Jonathan P. Polk, Freelandville, Ind., Corn Harvester. One-third of his right, title and interest in said invention.

Consideration \$20,000

COMMISSIONER OF PATENTS REPORT.

Some Excellent Suggestions and Recommendations.

The Commissioner states that, while impressed with the necessity of strict economy in the administration of his office, he has found that the proper development of the patent system demands two important additions to the resources of the offices, in order to properly assist the applicant to secure his patent and to serve the public by preventing the issue of duplicate or otherwise invalid patents.

In the interest of applicants he proposes to establish a classification division for the purpose of philosophically classifying the 533,077 patents already issued, together with the entire mass of foreign patents and printed publications constituting the field of search in the case of every application for patent, and he recommends that the following force be provided for this work: One chief of division, at \$2,750 per annum; 2 first assistant examiners, at \$1,800 each; 2 second assistant examiners, at \$1,600 each; 3 third assistant examiners, at \$1,400 each; 36 fourth assistants, at \$1,200 each; 4 clerks, 2 at \$1,200 and 2 at \$1,000 each; 2 copyists, at \$900 each; and 2 assistant messengers, at \$720 each. Incident to the proper inauguration of this policy, he also recommends the increasing of the appropriation for the scientific library to \$16,000.

The commissioner further proposes in the interest of the public to provide a systematic method of examination of industries to which patents pertain as they actually exist in the country at large. Patents now go to issue upon the result of searches among books and documents, and the disparity is often wide between industries as there exhibited and as actually conducted in factories and in commerce. To carry this policy into effect it is necessary that some part of the examining force be detailed temporarily to acquaint themselves in a practical way with the industries to which the work of their respective divisions relates, and an appropriation for this purpose of \$1,250 is recommended.

An appropriation of \$750 is also urged as necessary to provide for the transportation of patents and publications to foreign countries and to permit of the acceptance of foreign exchanges; the declination of valuable exchanges often becomes necessary, owing to lack of funds to pay for the transportation of the same.

The increase of the issue of the *Official Gazette* of the Patent Office is suggested in order that it be furnished free to small libraries other than public libraries, when they are accessible to mechanics, inventors, or students. The present law, act of May 18, 1872 (17 Stat., 131), requires that the libraries should be free in order to have the *Gazette* free, and this excludes nearly all maintained by associations, trades, and business establishments for the benefit of those connected with them. The necessity for the amendment of the law is apparent.

Attention is called to the fact, of which mention has been made in previous reports, that there are seventy-six copyists in the Patent Office receiving a salary of but \$720 per annum, whereas the lowest salary paid copyists in the other bureaus of the Department is \$900. It is submitted that such discrimination is unjust and unwise, and has the effect of causing the loss, from time to time, of trained employes, who seek transfers to other bureaus in which, for the same service, they will receive \$900.

The Commissioner adverts to the overcrowded and congested condition of the office as an obstacle to the transaction of public business, repeatedly brought to the attention of Congress by his predecessors, and concludes that—

With the growth of the office it is worse to-day than ever before in the history of the system. The crowding of the employes and the defects of ventilation, light and heat are such as are not tolerated in private business establishments and would not be permitted by any factory inspector in a state having factory laws. In my judgment it is not only a public loss, but a daily wrong to the employes of the government. It will never be righted, nor can the public business be transacted with reasonable dispatch, until this bureau is accorded the exclusive occupancy of the Patent Office or until a new and commodious Patent Office building is authorized and built.

There can be no doubt that additional buildings must be constructed for the Department of the Interior. The Patent Office should occupy alone the building erected for it, while the other bureaus, with the exception of the Pension Bureau, should be provided with suitable permanent quarters.

A Royal Rainmaker.

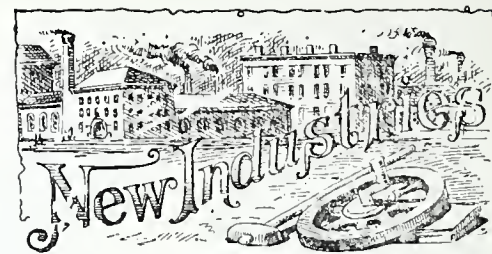
Mr. Johnson gives one or two stories as illustrating the kind of exploit by which the King obtains his reputation:

The King has the reputation of being a remarkably good hand at making a thunderstorm, and in this he gives way to no man. I remember one day in June—the one month in the whole year in which you least expect rain—some natives had brought a large python into camp, and were singing some of their rain songs. It is sudden death to any native in Matabeleland who, if he sees a python, does not by some means or other manage to secure it and bring it in alive. The King took possession of the reptile, and said he must go and make rain. I laughed at this, and said I did not think he could do so, to which the King replied, "You will see." The python was skinned alive, its liver taken out and cooked, and the usual rainmaking rites performed. Curiously enough, just before sundown the sky clouded over, and soon afterward one of the heaviest thunderstorms I had ever seen broke over the place. Next morning the King asked me if a white man could make a thunderstorm like that? I said, "No, King: if we could get you down amongst the farmers in the Karoo we could guarantee you a fortune."

He gives us his own explanation of the mystery that Lobengula knew from the fact that the wind had veered round and had blown for three days from the west, which is an almost sure sign that there will be rain on the fourth day. That, however, does not explain the coincidence of the discovery of the python; without it there would have been no attempt at rainmaking that time. Besides, Lobengula frequently tries to make rain when drought is persistent, and presents of cattle are brought in and whole kraals of suspected subjects are killed.

November Review of Reviews.

Four members of the Imperial College of Physicians at Peking who failed to give a proper diagnosis of his Majesty's indisposition recently were punished by having a year's salary taken away from them.



Standard Thermometer Company, of Peabody, Mass.; to manufacture thermometers, electrical appliances, etc.; capital, \$125,000. Samuel E. Lord, treasurer.

The Ashtabula Steel Company, of Cincinnati, O., is erecting some large workshops and will put in a large steam electric plant. One building is 100x38 feet, two buildings 65x340 feet, four buildings 25x65 feet, six buildings 46x65 feet, one building 60x320 feet, two buildings 20x250 feet and two buildings 30x100 feet.

A company has been formed for equipping the Chesapeake & Ohio Canal with the electric trolley system. The success of experiments with the Erie Canal has led up to this. Vice President Charles K. Lord, of the Baltimore & Ohio Railroad Company, is actively interested in the enterprise.

The Homestead Street Railway Company is a new \$300,000 concern at Pittsburgh, Pa., to establish an electric railway system.

The Fulton Truck and Foundry Co., of Mansfield, O., has been incorporated with a capital stock of \$80,000 to manufacture street railway trucks, railway frogs and switches, electric railway equipments and do a general foundry business.

There is a project on foot to build a rolling mill for making iron and steel sheets at a point on the Missouri river near Clinton, Iowa.

Aultman, Miller & Co., of Akron, O., will erect a new office and warehouse at Lansing, Mich., which is to be 60x125 feet, of wood, covered with corrugated iron.

The Gleuwood High Bridge Co., of Pittsburgh, has been granted a charter for the purpose of constructing and maintaining a bridge to cross the Monongahela river at Hay's station. The bridge will cost \$150,000.

The Iberia foundry, burned some time ago, will be rebuilt at New Iberia, La., though a number of sites were offered at other towns. The foundry was owned by F. S. Lutzenberger and leased by George Simon. Contracts for reconstruction have been let.

Work has begun on the approaches to the proposed steel bridge to be built across the Monongahela river from Brown's station to the lower end of Homestead. The building of this bridge will afford connections by two electric traction lines, between Pittsburgh and Homestead. The bridge will be of the cantilever pattern and will be one of the highest structures on the lower part of the river. The cost will be \$110,000.

Plans are completed for the new works of the Westinghouse Electrical & Manufacturing Co., at Brinton Station, near Pittsburgh, and bids are asked for a machine shop, 754x231 feet, and a warehouse, 754 feet long and 76 wide. The contracts for these two buildings will be closed Dec. 16. The other buildings, which will be built later, are a foundry, 700x150 feet; a punch department, 250x76; a carpenter shop, 200x75; a paint shop 100x50, and a power house, 76 feet wide by 300 feet long. All of these buildings will be two stories high.



The foreign commissioners seem to be very much disgruntled at the result of the awards and have united in a resolution of protest.

The *Columbian Guard* on December 1st, was 800 men. One would think this about four times as many as necessary at this stage of the Fair's taking off.

The Jackson Park authorities want half a million dollars damages before they will accept the World's Fair company's request to take the buildings off their hands.

The heroic statue of Brigham Young, which stood in the Utah building, cost \$25,000. It will be placed in the new tabernacle at Mount Zion, Utah. The pedestal cost \$25,000 additional.

The beautiful chime of steel bells in the German building was sent to Germany to be placed in the belfry of Grace Church, Berlin, as a gift from the Emperor in memory of his father Emperor Frederick.

The *Columbian Museum* which is the legacy of the Fair is being added to by gifts from all the exhibitors. A great many have turned in their entire exhibits to the Museum.

The first State to complete the removal of its exhibits from the grounds was the first to install them there. It is the fifth State in the Union—Missouri. They will be put on exhibition at St. Louis, for two years.

To show the impracticability of carrying on the Fair during the Winter months, the roof of the great Manufacturers building is pointed out where ten feet of snow lies in huge drifts and its glass roof is broken in.

On December 4th, the Administration building closed and locked its doors and the place was deserted, all the employees having been discharged. The beautiful structure, the greatest rendezvous of the Fair thus drew its mantle about itself to await the dread summons.

The World's Fair Commissioners have decided not to tear down the buildings, but to present them to the Jackson Park Authorities who will allow them to remain intact for one year for the benefit of the public. The outdoor statuary has been put into Winter clothing and looks very grotesque.

The model of the "Victoria," the British battleship was taken to pieces and sent to the International Exposition at Antwerp. This magnificent steel model attracted great attention at the Fair, particularly after the ill-fated vessel had been sunk in the Mediterranean.

Jno. Boyd Thatcher has moved to Washington, bringing with him a fine assortment of protests, threats, sniffs and contests enough to make the life of an average man wretched beyond description. Mr. Thatcher coolly asserts his ability to cope with all these untoward influences and make the awards in a proper manner.

AN INTERESTING PROJECT.

Long Distance Electric Railway Between New York and Chicago.



AN item has been going the rounds of the newspapers to the effect that a movement is on foot and the capital already pledged for an elevated electric railway from New York to Chicago. The electric railway has had a truly wonderful impetus and development within a very few years, but we can hardly credit any such statement as made by the item referred to. It is too long a step for our imagination to go from a street railway system of, say 10 or 15 miles length to a full-fledged trunk line nearly 1,000 miles between terminals.

Aside from the first cost of an elevated roadbed made as nearly an air line as the topography would permit—and this item alone would reach a stupendous figure—there are many things for which not even an approximate precedent exists. A direct current system would be out of the question, we believe. It is successful and satisfactory in our street railways whose limits of length are relatively short; but on very long lines the cost of copper would be prohibitive, even if the electrical pressure were put at its maximum safe point. On account of the dangers of short-circuiting armatures in railway service, we believe it would be unsafe to exceed 1,000 volts by the direct system. Hence the number of power houses would have to be so great that, adding their cost to that of the roadbed, it is difficult to see how an always timid capital could be attracted to the scheme. Not because of the mere objection of an extremely heavy figure of cost, but because of the uncertainty of the earnings being equal to the interest on the cost, without speaking of a profit to the stockholders.

With the alternating current of high tension and step-down transformers and motor-generators, the item of copper could be brought within reasonable limits, but the total cost of the plant would hardly be very materially changed.

The cost of roadbed would be so overwhelmingly the greatest item, that the others would almost sink into insignificance. Such an elevated railway would have to be a massive structure, whether as a masonry viaduct or a steel girder construction, in order to permit the extreme high speed at which trains would be operated. Probably a speed of 100 miles per hour could be maintained on the proper kind of roadbed. Such speed would not be permissible unless a pretty general level were maintained in the profile. That would mean frequency of very costly bridges and viaducts. Without going into details, we might dismiss the subject by saying that the present knowledge of electric railway construction is hardly advanced enough to take the risks and contingencies of an expenditure which would certainly reach into the hundreds of millions of dollars and possibly beyond them. Great and wealthy as New York is, and great and wealthy as Chicago is said to be, we do not think the combined available capital of the two cities could be induced to make the hazard.—*Electrical Review*.

Patience Wins Success.

Serious mistakes are often made by an inventor in accepting the first result by which he achieves the objective he is seeking, as the best and only one. Commercial

failure often results because the inventor has failed to consider his invention from every side, and make it answer every objection that he may possibly imagine a purchaser or an expert user to urge against it, not only as an entirety, but in every part and every movement. It will not be until every objection has been overcome, that he may reasonably anticipate that his invention will not soon be superseded by the improvements of other inventors, who have really had the great benefit of the labor and experience of the first, and are able to begin at a point nearer to complete success than the first inventor did. It will often happen, as illustrated in the history of the sewing machine, that an invention is being created by several inventors at the same time, and the fruit of it may be lost so far as protection by patent is concerned. Dr. Gatling invented a screw propeller, but John Ericsson had anticipated him by a few days. The doctor grew discouraged and gave up invention for a long time, but having his attention drawn to guns, he made a grand success of the famous Gatling. The fact shows the necessity of perseverance, and also the equal one of not confining attention to one thing too much. The mental effort, even though failure may follow at the first, will strengthen the mind for work in many other directions. Edison is noted for his versatility and the number of diverse machines and devices he has constructed. It will be found that nine out of every ten inventors have either failed or made only indifferent success at the beginning.

The Highest Observatory.

The observatory on the top of Mt. Blanc is an accomplished fact. The foundations imbedded in the ice are considered perfectly safe. It will be occupied continuously during the fine season, and self-registering instruments will be left behind for the winter. This observatory is being built by a Frenchman over seventy years old who was carried to the summit of Mt. Blanc in order to locate the site for the observatory. When it is built it will be the highest institution of the kind in the world. The atmosphere is always clear there and observations can be made unobstructed by cloudy weather. Excavations have already been made over fifteen feet in depth and nothing but solid ice has been found, as it always freezes on the summit, the foundation is as good as though it rested on solid rock.

At a test of the coast gun built by Krupp, the projectile was fired 65,616 feet. The projectile weighed 474 pounds, and a charge of 253 pounds of powder was used, giving an initial velocity of 2,099 feet. It is estimated that the projectile reached an altitude of 21,456 feet, its flight occupying 70.2 seconds.

There is a likelihood that a high-speed electric railroad will be built between Brussels and Antwerp in time for the Belgian Exposition. The daily traffic requires 16 express trains each way on the present steam roads. The route is direct and practicably level. It is proposed to run a single electric car, holding 60 people, every ten minutes, and making the trip in 20 minutes, at a speed of about 66 miles per hour. This speed, it is claimed, could be safely doubled later on, but it is contemplated to begin with a more moderate speed, and to increase it later. The cost of the road is estimated at about \$2,200,000.



On the San Francisco and San Mateo Electric railway a funeral or hearse car has been provided and the long tedious ride to cemeteries in carriages, over dusty roads is thus avoided.

It has been stated that if the power generated at Niagara station is used to bring a bushel of grain from the wheat fields to New York city the cost will be but five cents provided the canal is utilized for the purpose.

There were only three foreign exhibits of storage batteries at the World's Fair. One from Russia, another from Germany and one from France. Truly a meagre display when the original storage battery came from over the water.

A new use of the electric light is to employ it to search for bodies on the bottom of lakes and rivers. A dynamo is placed in a steam launch or boat and an incandescent light of sufficient power to illuminate the water is made to move along the bottom revealing the objects there.

Our English brethren are inclined to scorn our efforts at electrical engineering. An influential journal published in London says; "Our Paris-London and Glasgow-Belfast telephone cables are 'bigger things' than the long distance telephone between New York and Chicago!" Our people will hardly endorse this sentiment.

Prof. Nicola Tesla has designed an engine which has a mechanical efficiency of 99 1/2 per cent as against 81 or 82 per cent now reached in the ordinary engine. His boiler will stand a pressure of 350 pounds per square inch safely. He thinks we will produce very shortly twice as much electricity from coal as we are obtaining at present.

There was an ingenious device shown at the Fair which will be welcomed by the late comer whose "jag" prevents his finding the keyhole of his front door. It is an electric door opener. It is operated by the person stepping upon a mat communicating electrically with the latch of the door.

The Cataract General Electric Companies have full control of the distribution of electric power from the Falls of Niagara. They propose to have a trunk electric line from Niagara to Albany and supply current to places along the route and at the same time give a current for canal boat propulsion.

A Mr. Bandoir has succeeded in producing rain in Tunis, Africa, by means of electricity. His method is to send up a kite to the clouds and making a contact direct the drops instantly fall and cease when the contact is broken. This is a much pleasanter method than by high explosions which shatter the ear drum as well as the air and clouds.

An industry which is novel and pleasing is just now coming into public notice. It is electro-pyrotechny or electrical fireworks. The spectacular effects at the World's Fair illumination have stimulated it.

Inventive Age

MONTHLY. \$1.00 A YEAR.

JAMES T. DUBOIS, }
R. G. DUBOIS. } EDITORS AND PROPRIETORS.

All communications should be addressed to
THE INVENTIVE AGE, 8th and H Sts., N. W.
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Nothing will be published in the editorial
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We invite correspondence from inventors and
mechanics

Correspondents should give their full names
and address, not for publication, unless desired
but as a guarantee of good faith.

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WASHINGTON, D. C., JANUARY, 1891.

No less than six million passengers were
transported on the great intramural railway
during the Columbian Exposition.

In the tanning industry electricity is be-
ginning to play an important part. The
largest tannery in Switzerland will soon be
reconstructed and enlarged for the purpose of
adopting the process of electric tanning.

BETWEEN May 1st and October 1st nearly
one million passengers were carried on
the electrically propelled launches at the
World's Fair. The number of boats in
service were 54, they made fifty-six thou-
sand trips and ran about one hundred and
seventy thousand miles.

It is now believed that the Brooklyn
Bridge will soon adopt electricity for the
propulsion of the cars. Electricity seems to
be displacing steam in most of the fields of
industry and it is believed by many that the
age of steam will in the next decade be a
thing of the past.

SWEDEN has always been famous for its
excellent matches and now its fame is to be
extended by the establishment of a great
water-power plant which is to be used for
the electrical production of chlorate of pot-
ash. This is to be used in the manufacture
of friction-matches.

ELECTRICITY for light and power is one of
the great factors in the mining industries of
this land. Over three hundred mining
companies are now using electricity. By
electro-lytic processes nearly one third of the
amount of copper we find in this country
is produced.

RECENTLY a number of tubes of glass
have been found imbedded in the sands of
Maryland. Upon examination they were
found to be fulgurites. It seems that these
tubes were formed by the contact of light-
ning with sand. When a bolt penetrates
a mass of sand it fuses the silica so as to
form the tubes of glass. Specimens have
been found which were three inches in di-
ameter.

NATURE has met man more than half
way in providing the possibilities of cheap
transportation. The rich iron ores of Wis-
consin and Michigan lie within easy access
of the Great Lakes by which they may be
transported nearly to the coal required for
their smelting. The great pine forests of
these States and Minnesota are situated
about streams on which their lumber can be
borne to the Lakes and the Mississippi
River for general distribution throughout
the central half of the United States.

But nature never does quite all; there are
important details in this general system of
waterways which have yet to be supplied.
The Dakotas, rich in grain, are but poorly
supplied with lumber and fuel, and have
only a single water course of importance.
The Missouri River is destined to be an im-
portant highway of domestic commerce and
of traffic between the Dakotas and other
States; but it alone cannot secure cheap
transportation for Dakota grain. Its course
runs too far to the south, and too much
aside from the lines which most of the
freight imported must follow, and the ex-
ported grain must take to reach the seaboard
and Europe. The industrial development
of the great Northwest east of the Rocky
Mountains and especially its agricultural
interest, are most closely connected, first
with the extension of the navigation of the
Great Lakes to Pittsburg, to St. Paul, and,
if possible, to the seaboard of the United
States; second, with the further canalization
of the Mississippi and Missouri rivers and
their most important branches; and third,
with the connection of this system of river
navigation with the Great Lakes by canals
of ample dimensions. The people of the
Pacific States and those who wish to buy
their grain and lumber are especially con-
cerned with two enterprises, the improve-
ment of the Columbia River and the con-
struction of the Nicaragua Canal. The pres-
ent status of each of these works and the
economic significance of their execution
merit consideration.

WHAT next? A sensation has recently
been created in Boston, especially in the
electrical world of the "Hub" by a new
typewriter which is electrically operated.
It seems that this machine is so arranged
that it may be electrically connected with a
similar instrument at a distance and so ad-
justed that a copy of the work may be auto-
matically reproduced thereon, even in the
absence of an attendant. This opens the
door for an entire new field for the type-
writer in which there must be a great future.

BERLIN has always held a prominent
position in the field of electricity. Some of
the greatest advances of that land have been
accomplished at the Imperial Capital of the
empire. Recently a system of electrically
controlled clocks has been arranged for the
city in connection with a power and light
service. Every day at the time when a few
lamps are in use a momentary diminution
of pressure in the mains of about ten volts
winds and sets the clocks which during the

rest of the time are disconnected from the
circuit.

It only awaits the invention of a really
good insulated wire which combines the
impermeability and moisture resisting quali-
ties of the gums with the cheapness and
convenience of the fibers to bring about one
of the more important reforms now needed
in the telegraphic service, that of the estab-
lishment of a sufficient number of under-
ground trunk lines between our principle
commercial cities. It is said that an old
and experienced electrician in the trans-At-
lantic cable companies has invented a wire
that answers this purpose.

THERE seems to be no good reason why
women should not be largely employed in
the field of electricity. There are three
characteristics which woman possesses in a
far higher degree than man, unwearied pa-
tience, dexterity and quick instinct, these
with other mental and physical endowments
would give her a decided advantage over
man in many of the processes employed by
electrical manufacturing companies. We
believe the future will prove that more
women can do better work in the broad
field of electrical development and applica-
tion than can man.

THE public is no longer apathetic con-
cerning the extension and wider use of in-
land waterways. The steadily increasing
demand for cheap rates has led shippers to
increase the volume of water traffic, and the
liberal policy which Congress has pursued
in the improvement of natural water routes
has made possible the rapid growth of this
inland commerce. The statistics of the
traffic on our more important natural water-
ways show this in a striking way. During
the census year, 1889, the Ohio River above
Cincinnati, including its branches, had a
fleet of 5,214 boats and barges, by means of
which 10,744,063 tons of freight, mostly
coal, were carried. The ton mileage of this
freight was over two billion ton miles, or
two and seven-tenths per cent of the ton
mileage of the rail traffic of the entire United
States during the year ending 1890. The
freight on the rivers of the Mississippi Val-
ley in 1890 was placed at 31,050,058 tons.
This is about five per cent of the tonnage
of the railroads for the same year, and is
probably less than the amount actually
transported. The freight traffic on the Hud-
son River, during the same year, was 15,000,-
000 tons, or, including the 3,500,000 tons
that it received from the State canals of
New York and floated to tidewater, 18,500,-
000 tons—a sum nearly equal to three per
cent of the total rail freight. The Great
Lakes are, of course, not only our greatest
waterway, but the most important inland
highway of commerce in the world. The
traffic is enormous. During the year end-
ing June 30, 1892, 10,107,603 tons of freight
passed St. Mary's lock, between Lake
Superior and Lake Huron, en route for
such distant ports as Chicago, Cleveland,
Buffalo and Liverpool. The tonnage of the
the Great Lakes is equal to ten per cent of

that carried by all our railroads, while the
ton mileage of this lake freight is fully
twenty-five per cent of that of the railroads.

NEW ENGINE OF WAR.

Louis Gathman, a Chicago man, not con-
tent with having invented and sold for
\$100,000 a gun of great destructiveness, has
built a model of a submarine boat which
when equipped with an also newly invented
sub aquatic weapon will change, if the in-
ventor's claims hold good, the modern sys-
tem of naval warfare.

The Whitehead torpedo can be projected
accurately under water 1,000 yards. It
will make this distance carrying about 175
pounds of high explosives. This marks the
highest point of progress yet made with
sub-marine weapons. The Whitehead tor-
pedo moves so slowly that but a slight
drifting motion of its object of attack would
carry it out of the line of fire long before it
could be reached by the torpedo, even
though the drifting did not begin until af-
ter the discharge of the torpedo gun.

But Mr. Gathman has been experiment-
ing under the waters of Lake Michigan all
this summer, having as spectators officers
of this and other governments, who were
drawn there by the attractions of the World's
Fair. Gathman's claim for torpedo is an ac-
curate underwater range of one mile, a
carrying capacity of 500 pounds of gun-cot-
ton, and a time allowance of one minute
for the entire distance. This means sim-
ply that if a little submarine boat equipped
with one of these weapons could get within
a mile of the heaviest armor-clad afloat the
giant would be absolutely at the mercy of
the pigmy, which would need to deal but
one blow to effect the annihilation of its ad-
versary.

In addition to the submarine gun, a wea-
pon which in one form or another has oc-
cupied the attention of inventors for many
years, Mr. Gathman has invented another
weapon which, as far as its method of use
is concerned, is absolutely and radically
new. He calls it a subaquatic and aerial
gun, giving the same name to its torpedo
projectile. It has always been supposed
that anything like accuracy of aim could
not be secured when a part of a projectile's
course was through a body of water. Mr.
Gathman says that he can fire a submerged
gun, send its projectile through forty feet of
water, and then through five miles of air
and have it to hit the target or as close to
it as it would have struck had the whole
course of the missile been above water. This
is another claim the substantiating of which
will astonish men who have made ordnance
and gunnery a study. But Mr. Gathman
has experimented, has results to show, and
has witnesses to attest that he has accom-
plished what he claims. Of course he has
not thrown 500 pounds of gun-cotton into
Lake Michigan, neither has he used a wea-
pon capable of throwing that weight of
material, but as scientific truths hold for
great things as well as for small where a
common principle is involved, the experi-
ments on a comparatively small scale may
be said to have proved the point.

FOR THE INVENTIVE AGE.

Dame Nature Cares for Man.

In comparing the great utilitarian enterprises of to-day with those simple ancestral processes out of which they one and all spring, it must not be forgotten that Nature as well as art has been concerned. The very genius of commerce, for instance, is taking commodities from places where they are superabundant and from ownerships where there is an excess over wants and placing them where they are wanted. It is a change of place to relieve excess and to supply demands. The savages, also, had their changes of place and of ownership constituting a primitive or elementary commerce, having all the characteristics of the modern. But, I am now speaking of something that preceded even this. Nature had her great centers of superabounding material and took pains to convert this excess into supply against scarcity. She had devised her balance wheels to effect uniformity of life and to preserve it against famine and failure. As examples of this let me point out two or three examples:

1. She stored up for man the excess of one season to supply the scarcity of another season of the year. Many examples of this could be cited. In certain regions of California the pinon seeds grow so abundantly that the Indians could not gather them; but the squirrels did lay them up in vast quantities, fed on them in winter and themselves were eaten by the savages at a time when meat diet was most necessary.

2. She used the excess of one locality to supply the dearth of another locality. In some places along the great lakes the wild rice (*Zizania aquatica*) covers thousands of acres and feeds millions of water fowl. These same creatures are the source of food for the Eskimo, who never saw a spear of grass nor ate a mouthful of vegetal food.

3. But the most marvellous of all these commercial enterprises of Nature is that in which she converts apparently inaccessible and unutilizable material into inexhaustible supplies for every industry of man. The most wonderful example of this is found in the ocean pasture grounds. There is a bench of land under the sea, skirting every shore and reaching under all estuaries. It is not deep. Indeed, it is the connecting link between the land and the profound sea. Upon this bench the debris of the fertile lands and fresh waters are daily poured and myriads of the lower plants and animals are developed. Here are nourished cod, shad, herring, salmon, oysters, clams, and so on. The fish, after attaining maturity, actually swimming up to our doors to be captured. Also upon this pasture ground are nourished the sea mammals, which have been indispensable to the life and happiness of our northern aborigines. It is true that every useful plant is converted by Nature out of material which men cannot use. But, long before Texas cattle were reared in one place and driven hundreds of miles to market, Nature reared fish and seal and walrus upon her enormous

pasture lands under the sea and drove them to market herself.

O. Mason

Electricity by Water-Power.

SCAR Bradford, in a very interesting article in the *Electrical Review*, says: No invention of modern times, unless it was the steam engine, has exerted such a far-reaching influence over the distribution of population as that of Sir Henry Bessemer in his process for making cheap steel. The steel rail has enabled railroad companies to increase the weight and carrying capacity of their rolling stock and thereby so reduce the cost of freight that the farmer of the Mississippi valley could lay down his products on the Liverpool market at prices lower than any competitor. This demonstration was at the bottom of an emigration that astonished the world. Under its influence population was pushed westward nearly to the base of the Rocky Mountains and the extreme limit of the rain belt. The Bessemer converter really gave to Chicago its million and a half of people and issued growth and prosperity to St. Paul and Omaha, St. Louis and Kansas City. With a fertile soil were combined the advantages of cheap coal for heat, light and power. Water and rail transportation seemed to indicate that in the Mississippi valley and on the plains of Kansas and Nebraska there existed all the elements necessary to create an empire unequalled for numbers and wealth in the history of the universe.

But shrewd observers see in the immediate future the commencement of a movement destined to reach proportions beyond precedent. They see conditions which insure the birth of a new and greater empire as the result of another invention—the dynamo. No one need be told of the advances made by electricity as an aid to human effort in the past 10 years, even under the discouragements of undeveloped appliances and expensive fuel. What will it be with perfected mechanism and no requirements for coal? What cannot be said in favor of a country where heat, light and power are practically free where habitations are maintained at a comfortable temperature for next to nothing, where night can be turned into day by the luminous carbon, where the cooking is done by the turning of a switch, and machinery harnessed to unlimited power all through the agency of a waterfall inexpensively trained to man's use by a turbine wheel? Add to these advantages a soil so rich that it would manure the blackest loam in Illinois, a climate so healthful that disease is almost banished and rainfall a manifestation to be controlled independently by the will of each cultivator; locate mountains of gold, silver, copper and lead ores, of coal and iron, every variety of building stone and sand and clay without limit; find thousands of square miles of valuable timber, broken and threaded by beautiful lakes and running streams, and there you have the Rocky Mountain region, extending from the northern border to Arizona.

It is evident that under such conditions a comfortable existence can be maintained with the least effort, hence the certainty that with a return of financial ease a mighty movement of population will be headed toward the setting sun. That a hunger for land exists is evidenced by the contentious strife of the invaders of Oklahoma and the

Cherokee strips. What may be expected when the people realize that millions of acres may be had for the asking in a country which irrigation will make as fruitful as the Nile valley and where on all sides never-failing waterfalls solicit work? What boundless opportunities will capital find for investment in the canals and electrical developments in the railroads to be called into being by the enormous traffic and in the rapidly enhancing town and country property?

The possibilities of the subject are exhaustless, and they will soon be written in the throng of emigrants and capitalists westward on settlement and profit bent, in the swelling tide of population which will enliven the mountain valleys and make of Helena and Spokane, Salt Lake and Denver cities in which the wealth and power of the republic will find no grander expression.

A GREAT CONVENTION TOWN.

Electric Light Association to Meet in This City, February 27, 1894.

The Executive Committee of the National Electric Light Association met at the Hotel Lafayette, Philadelphia, recently. The following members were present: President; E. A. Armstrong; secretary, Geo. F. Porter, master of transportation, C. O. Baker, Jr., and Messrs H. H. Fairbanks, John A. Seely, H. J. Smith, E. F. Peck, A. J. De Camp. Others present were Mr. Burleigh of Camden, N. J., and Messrs. R. B. Corey, Geo. M. Phelps and Chas. W. Price, of New York.

After some discussion it was decided to hold the next meeting of the association at Washington, February, 27, 1894.

The Committee on Programme was appointed consisting of Messrs. A. J. De Camp, C. W. Price, & H. H. Fairbanks. The Committee on arrangements, comprise the following gentlemen, C. O. Baker Jr., Fred. Royce, Sam Bryou, and M. J. Francisco.

It was decided not to have an exhibition of apparatus under the auspices of the association, but all manufacturers will be welcome who care to exhibit during the meeting.

It is dead at last materially, but in spirit it will live on forever. That great enterprise for which the Empire city and the mighty Colossus by the inland sea struggled for months in the halls of Congress to secure, was created, has been enjoyed by millions, and is now being razed from the face of the earth. For six months, within the limits of a few acres of ground, one could see more things in three days time than in three years in five of the greatest Empires on earth. The influence that the Chicago exhibition will exercise on many during the next generation will be greater than the combined influence of all the other exhibitions that have ever been on earth. It is a grand monument to Chicago, a glorious triumph for America and must prove a lasting benefit to all mankind.

AT THE PATENT CONGRESS.

Among those who participated in the Congress were Hon. Henry W. Blodgett, for twenty-three years Judge of the U. S. Courts at Chicago; Hon. John W. Noble, ex-Secretary of the Interior; Hon. Richard Pope, Canadian Commissioner of Patents; Hon. John S. Seymour, U. S. Commissioner of Patents; Hon. Benton J. Hall, ex-Commissioner of Patents; Hon. Beuj. Butterworth.

Pack Your Raw Cotton Better, Gentlemen.

The packing of American raw cotton causes a deal of anxiety and complaint here. The jute-cloth covering is so torn before the bales reach Chemnitz that the cotton is exposed to mud, water, fire, and theft. Of the original six or eight iron bands two, three, four, and sometimes more are loose or broken; the cotton bulges out, takes up dirt and dust when in a dry place, mud in the docks, sea water when in the ships, and rain water when on land, on wharves, or in transmission by boat, rail, or wagon. To transport every gust of wind tears away pieces of the valuable commodity. The wharves, custom house floors, and freight cars are usually covered with pieces torn or dropped from such bales; and the danger from fire is great, for cotton ignites easily, and sparks from cigars or locomotives, fanned by winds, even those caused by the movement of a train or wagon, could cause not only the burning of the cotton, but of other valuable property.

Contrasted with the packing of Egyptian and Indian cotton, the American must be regarded as very bad. Both Egyptian and Indian have close, compact, tough coverings, are rather long and smooth, leave little or none of the cotton exposed, are easily and plainly marked, and are wrapped close and bound strong and tight. Along the sides the firm's or seller's name appears. On both ends the kind of cotton is indicated to aid in identification should one end be torn off in handling, as sometimes happens. Thus, in the case of Indian and Egyptian cotton, mixing of bales and bales without marks seldom if ever occur; on the other hand, with American cotton both happen very frequently—too frequently, hence the complaint.

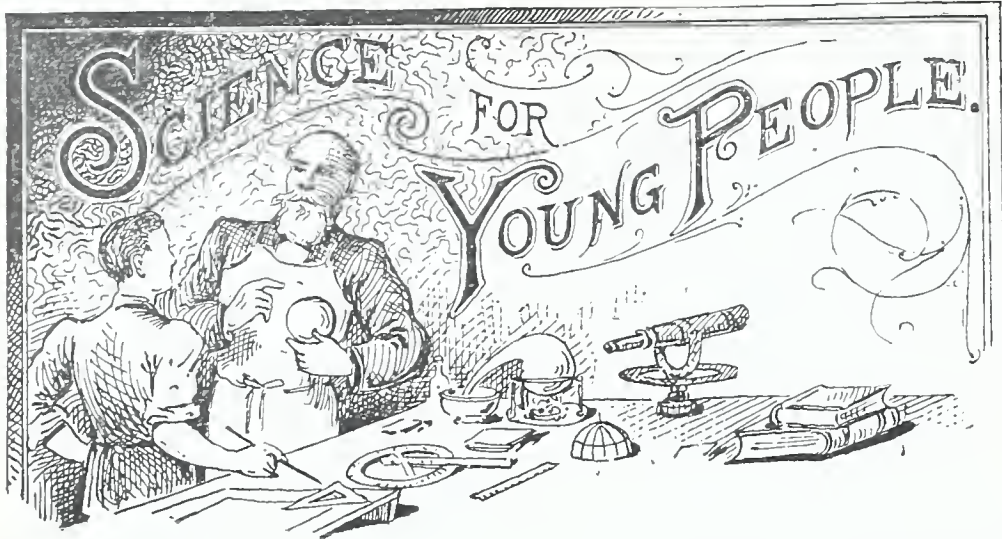
J. C. MONAGHAN,
U. S. Consul, Chemnitz.

General Policy of the Gothenburg Company.

The general policy of the Gothenburg Company seems to have been, says Dr. Gould: "First, strict control. Care was taken that the saloons should be opened in the quarters of the cities where there is a great deal of light and movement, rather than in the dark and low neighborhoods, so that they might be directly under the public eye and everybody know what was going on. Second, the purpose was to reduce to the lowest limit of public necessity the number of licenses used in proportion to the population. In the third place, the policy of the company has been to raise the price of spirits concurrently with lowering the amount of alcohol they contain."

This Is For You, Friend.

We will mail to every person sending us one dollar and twenty five cents the following: THE INVENTIVE AGE, one year, Picturesque Washington, a handsome volume descriptive of the Nation's Capitol, containing 260 pages and 136 interesting illustrations, also an Altograph of the city showing the streets, parks, monuments and public buildings. These two beautiful works are the next best thing to a trip to the Capitol of the Nation, the most beautiful city on earth. "Picturesque Washington" was formerly sold for \$2 a volume. We have purchased the edition and therefore are in position to make this remarkable offer. You could not give your friend a more acceptable Christmas present at the same expense. It will beat all 1893 Christmas gifts for the money invested.



Conducted by E. P. LEWIS.

We are apt to think that a boiling substance is uncomfortably warm, but this is not always the case, by any means. In fact, some boiling substances would be so uncomfortably cold that it would be more unpleasant to touch them than to dip your hand in boiling water. A substance is said to boil when it changes rapidly, and somewhat violently, from a liquid to a vapor, as when water is changed into steam. The boiling temperature of platinum or iron is at several thousand degrees Fahrenheit, while water boils at 212 degrees and ether and alcohol at much lower temperatures. All the different gases except hydrogen have been made liquid by great cold and pressure. Their boiling points are the temperatures at which they become liquid, and in the case of oxygen and nitrogen are about 300 and 400 degrees below the freezing point of water. The temperature of boiling of the same substance is not always the same. It depends upon circumstances. If water is in a closed vessel from which the air has been partly pumped it will boil at a low temperature; if you compress the air in the vessel the water will get much hotter before it boils. The water in the boiler of a steam engine in which the pressure is 150 pounds per square inch is nearly twice as hot as ordinary boiling water. A simple experiment will show that water may boil when quite cold. Put water in a large bottle until it is half full, and boil it until the bottle is filled with steam. Cork it tightly and allow it to cool. When it can be easily handled, hold it under cold water running from the hydrant, and it will at once begin to boil. This is because the steam in the first place drove out the air, and was then condensed when cold water flowed over the bottle, leaving a partial vacuum. We see, then, that the temperature of boiling water depends on the pressure of the air above it.

The conduct of a boiling liquid is easily explained if we consider that all liquids—and solids, too—are made up of small "molecules," which are in constant motion. When they are heated they move more rapidly. In fact, heat is believed to be nothing but the effect of rapid motion of the molecules of matter, so that when we heat a substance we simply make its molecules move faster. As water becomes heated some of its molecules move so fast that they shoot out in the air above the water and escape. This is called evaporation. After a while they begin to move so violently that they break apart from each other in the mass of the water, forming bubbles of steam. Unless the pressure of the steam in the bubbles is at least as great as the pressure of the air the bubbles will collapse before it can escape. If it is greater, the bubbles will rise through the water and the steam will

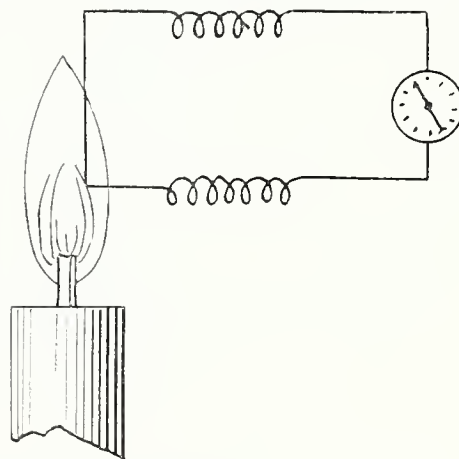
pass off. The air tends to push the molecules back, and if its pressure is made greater or less the boiling point will be raised or lowered. Evaporation goes on, more or less, at all temperatures, so that solid snow or ice would slowly disappear, without melting, if the temperature should remain a long time below the freezing point. The pressure of the air is very small on high mountains so that in such places water cannot be heated enough to cook food unless it is in a tight vessel so that its own steam may cause a high pressure. Such a vessel is called a digester, and is often of great practical use—for example, in securing gelatine from bones. If the water is made as hot as possible, it will dissolve the gelatine more completely. Another use is made of this principle in sugar refining. The syrup is boiled down in "vacuum pans," at a low temperature, so that there may be no danger of burning it. Mercury has to be distilled to separate it from impurities, and this can be done much easier in a vacuum, requiring less heat.

Heat being a kind of motion, may do work by moving the molecules of bodies. This work may be of two kinds. First, it may make the molecules move faster. This makes them hotter. Second, it may separate them doing work against their attraction for each other. This kind of work does not make them hotter. After a liquid begins to boil no amount of heat will make it hotter—all the heat goes to separate the water molecules into steam. When a liquid evaporates it must take heat from surrounding bodies to separate its particles. That is the reason why ether poured on your hand makes it feel so cold. The ether has a low boiling point and rapidly evaporates, taking heat from your hand. Artificial air is made by causing some substance, for instance ammonia gas, which has been condensed to a liquid, to evaporate quickly around a vessel containing the water to be frozen. If you put a watch glass wet on its under surface with water, on a table, fill it with ether, and blow on the ether with a bellows, it will evaporate so rapidly that the watch glass will be frozen to the table. It evaporates more quickly when blown on because the particles of ether vapor are then carried away as fast as they are formed, giving other particles a chance to escape. When liquid oxygen and hydrogen evaporate they produce the most intense cold known—several hundred degrees below zero. In just the same way heat is used up in melting a solid; for instance it takes 80 times as much heat to melt a pound of ice, without changing its temperature at all, as to raise a pound of water one degree. The heat used up in changing the state of a substance was once called "latent" or concealed heat, but we now know that it is not hidden in the body, but has been used up in doing work. Freezing mixtures are made by mixing two

substances, one at least being solid, which have great attraction for each other. The one most used is salt and ice. For some reason there is great attraction between water and the salt, so that the ice melts in order to dissolve the salt. The heat necessary to change the condition of the ice must come from the bodies near it—an ice cream can for example. When a vapor condenses to a liquid or a liquid freezes into a solid it gives up the heat which was used up in vaporizing or liquefying it. That is the reason why just after a rain or snow the weather is generally warmer.

We think of glass as a very brittle substance, but it can be drawn out into threads which look and behave very much like silk. You can easily make such threads by heating the middle of a small glass tube in a hot gas flame, and after it has been softened drawing it out very quickly. One of the most beautiful things at the Chicago Fair was a glass dress woven out of such threads for the Princess Eulalia of Spain, and it was very interesting to watch the process of spinning and weaving the glass. To spin it, a glass rod was first heated at one end. A fine thread was drawn out and fastened to the rim of a large wheel. A boy kept the glass soft in a gas flame, and the wheel was set in motion, drawing out thread and winding it around its rim very rapidly. The thread was then woven in an ordinary loom. Quartz crystals are much harder to melt than glass, but even they may be softened in a blow pipe flame and drawn out into fine threads—so fine that some of them have become invisible while being drawn out under a powerful microscope. These quartz fibers are now regularly made and used by electricians to suspend delicate galvanometer needles. They are much finer and stronger than silk fibers, which have been generally used for this purpose.

A steady current of electricity—a very small one, though—may be obtained from an ordinary candle or gas flame. If you connect the ends of a copper wire to a sensitive galvanometer, and hold a part of the wire upright in the flame, as shown in the



figure, the needle will be affected as long as the wire is held there. If the wire is held horizontally there is no current. The flame acts somewhat like a weak galvanic battery, the lower part of the flame corresponding to one electrode and the upper part to the other.

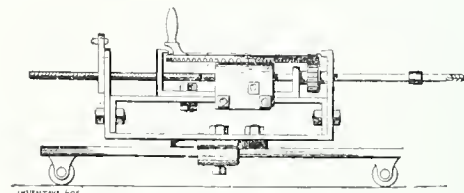
A Flying Machine to Boom Lots.

The baldest case of coupling a real estate speculation with a chimerical mechanical invention that has come to our notice recently occurs near this city, the advertisements as published in at least one of the city papers giving a cent of an air ship supposed to be on its way to Europe, the time

being given as 24 hours. This air ship is to be built entirely of steel 774 feet long, 144 feet diameter, and is to be completed within 18 months at a village in which there are many vacant lots. Consequently and therefore the trusting public ought to step up and buy these lots "on favorable terms." As a further reason why these lots should be purchased it is stated that the cylinder of this air ship will be air tight and that the air will be pumped out of it, and below this cylinder will be rigidly suspended a three story steel car 425 feet long. Darius Green with his flying machine missed a golden opportunity. He should have bought a tract of improved land and sold it out in building lots while constructing his machine, but it seems not improbable that those who may find it possible to buy lots will have to subscribe to mechanical journals that make a practice of exposing the fallacies of the various manufacturing schemes that are to boom corner lots.—*American Machinist.*

An Improved Drilling Machine.

We give below an illustration of the improved drilling machine recently invented by Mr. Robert F. Wyatt, of Jasper, Alabama. This machine seems to possess some remarkably fine features, among which may be enumerated an improved drill feed, and improvements in means for adjusting the



machine at various angles and positions. He has also constructed a very ingenious and effective frame for carrying the drilling mechanism.

The screw feed is effected by means of a sectional nut, arranged to embrace a screw threaded drill shaft, and by devices for imparting to the shaft a rotary movement, and at the same time allowing the shaft to move longitudinally. Thus it will be seen that the shaft is revolved by the devices above mentioned, and simultaneously advanced, and that this advancement is necessarily uniform, since by making the screw threads on the shaft true it will be impossible for any irregularity to attend their operation.

It will be readily understood that the capability of adjusting a drill of this class to every angle in relation to its base, and at the same time advancing it as the drill proceeds into the rock, is a valuable attribute; and this Mr. Wyatt attains by constructing the machine so that it may move forward on two parallel tracks, and at the same time, by means of a series of openings and a binding bolt, to be adjusted radially on a vertical axis. The efficacy of this arrangement need not be pointed out, since it will be apparent to all persons acquainted with this class of inventions; for it is of the utmost importance that a drill be capable of action at various points, without having to move the body of the machine.

Mr. Wyatt is now engaged in putting his invention before the public, and is meeting with great success in this line, since all who see it agree in saying that it is the best machine of the class ever produced.

The INVENTIVE AGE for one year and two copies of your patent cost \$1.

A SUPERIOR INVENTION.

Harms' Feed Water Regulator for Steam Boilers.

The accompanying cut shows the Regulator in connection with a Donkey Pump and Heater. We will suppose that the boiler has been filled with water to the first gauge and steam has been raised to a working pressure; that the Regulator is connected to the boiler at the second gauge (if it is desirable to carry two gauges of water). The pump is set in motion and as the water is below the second gauge the valve on the Regulator is closed for the steam now occupies the expansion pipe which is expanded sufficient to close the valve. Water is turned on a little strong, *i. e.* the boiler is receiving more than it is consuming, but just as soon as the boiler is filled to the top of the second gauge water takes the place of the steam in the expansion pipe causing it to contract and the valve in the Regulator is opened, and the water instead of going into the boiler is carried to the heater, as shown in the cut. Just as soon as the water lowers in the boiler sufficiently to let steam into the expansion pipe the valve in the Regulator closes and the boiler again receives water. So faithful is this little servant that no attention need be paid to it for the water will be held at nearly the same point day after day.

It may also be used in connection with an Injector or Inspirator. Where water is plenty the surplus can run at will, or in case of drilling a well it may be piped into the rig.

1st. *Safety.*—In nearly every boiler explosion the cause is said to be on account of low water and that the explosion is due to the fact of filling boiler while the crown sheet is bare.

2d. *Uniformity of Pressure.*—When the water is kept at the desired point steam can be made more rapidly, thus keeping the required quantity of dry steam and a uniform pressure.

3d. *Saving in Fuel.*—By keeping the water at the desired point a great saving in fuel can be made, for it takes more fuel to fire an over-filled boiler than where it has the proper volume of water.

4th. *Prevents Freezing.*—Where water is continually on the move there is no danger of the pipes freezing. This is a great advantage, especially in the oil country.

5th. It can be used with any kind of a Pump, Inspirator or Injector. Where hot water is used and brass valves are required or where rubber valves are used the Regulator can be used in both cases by a slight change in the connections.

OFFICE OF WELLSVILLE WATER CO.
AND ELECTRIC LIGHT CO.
WELLSVILLE, N. Y., Oct. 17, 1893.

To whom it may concern:

We have given the Harms' Feed Water Regulator a trial on our boilers and can

recommend it as being a perfect success. For a simple automatic regulator it is the best we have seen yet.

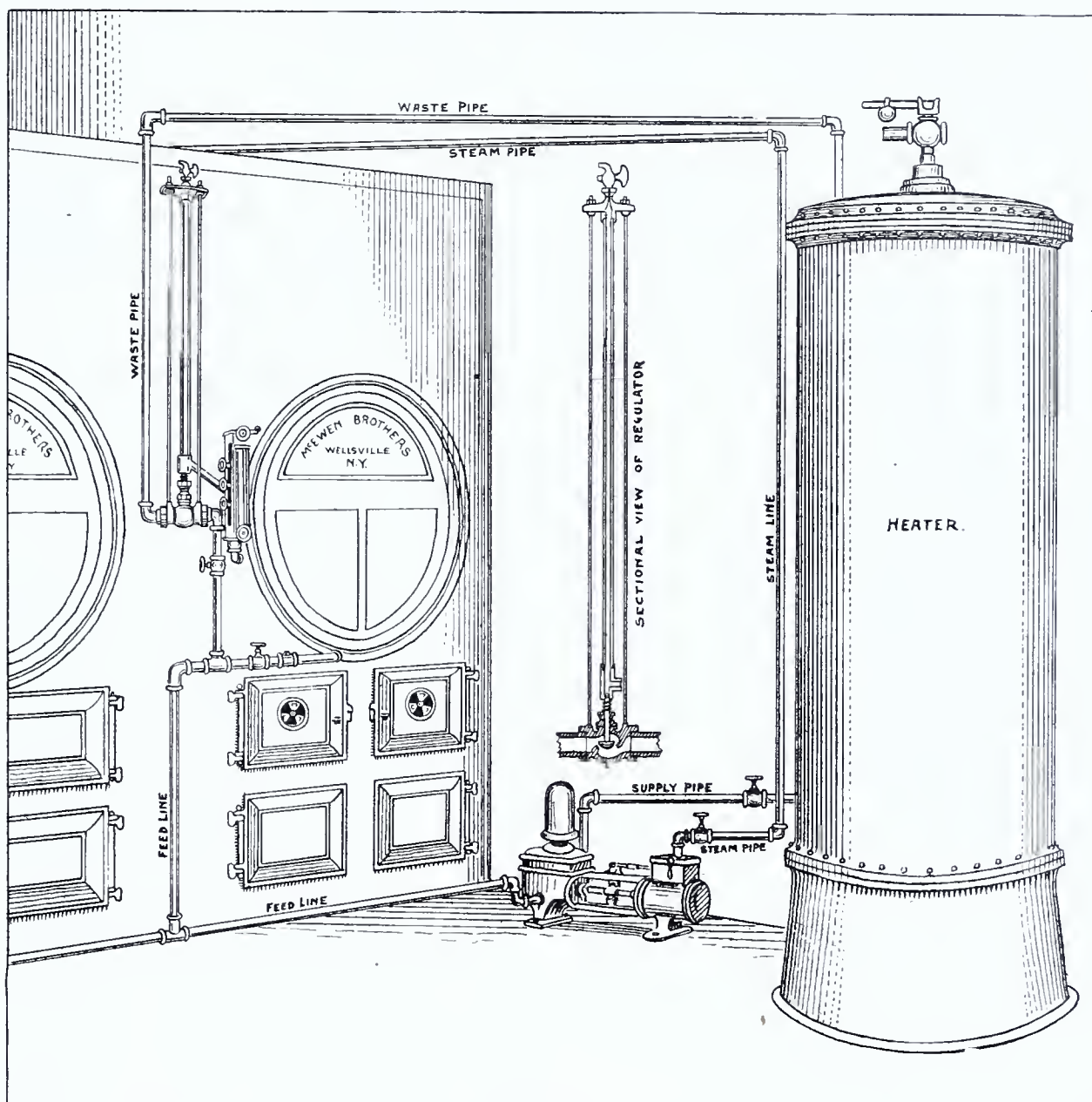
R. W. LAWTON,
Supt. Wellsville Electric Light Co.
CHESTER BIXBY,
Engineer Wellsville Water Co.

PIKEVILLE, N. Y. Nov. 8, 1893.

For the past week I have been using and thoroughly testing the "New Harms' Water Feed Regulator," and can truthfully pronounce it a perfect contrivance. That it will do all that Mr. Harms claims for it, and I cheerfully endorse it as being a first-class regulator in every respect.

Yours truly,
JOHN C. O'DAY,
Engineer National Transit Co., pump station.

For information address A. E. Harms,
Scio, N. Y.



TRIALS OF INVENTORS.

How the Inventor of Printing Suffered.

Successful inventions, however, like successful men, are comparatively rare, and have become successful because they were needed, or because peculiar conditions or events encouraged their production. The art of printing by means of movable types is an illustration of this in a manner, but is also illustrative of the trials, disappointment and neglect of the inventor.

John Gutenberg of Mentz, Germany, was the undoubted inventor of printing by movable types; but his success aroused the jealousy of his associates, who induced the authorities of Strasburg to demand the revelation of his secret—refusing which, he was driven out and returned to his native

town penniless. Here, again, he was subject to persecution, and, though his last years were peaceful under the patronage of the elector of Nassau, he died a poor man.

On the other hand, both Faust and Schoeffler, who had been associated with him and stole the art, grew rich, and tried to rob him of his fame. There is a curious, but not very well authenticated story about a visit Faust made to Paris to push the sale his of Bibles.

"The tradition of the Devil and Dr. Faustus," writes d'Israeli in the "Curiosities of Literature," "was said to have been derived from the odd circumstances in which the Bibles of the first printer, Fust, appeared to the world. When Fust had discovered this new art, and printed off a considerable number of copies of the Bible to imitate those which were commonly sold as MSS., he undertook the sale of them in Paris. It was to his interest to conceal this discovery

and to pass off his printed copies for MSS. But enabled to sell his Bibles at 60 crowns, while the other scribes demand 500, this raised universal astonishment, and still more when he produced copies as fast as they were wanted, and even lowered his price.

"The uniformity of the copies increased the wonder. Informations were given in to the magistrates against him as a magician; and on searching his lodgings a great number of copies were found. The red ink—and Fust's red ink is peculiarly brilliant—which embellished his copies, was said to be his blood; and it was solemnly adjudged that he was in league with the Infernal. At length he was obliged, to save himself from the bonfire, to reveal his art to the Parliament of Paris, who discharged him from all prosecution in consideration of the wonderful invention."

The Great Ship Canal

The great Manchester Ship Canal will be opened for traffic, probably about the middle of this month, certainly as early as January, 1894. New Orleans is arranging to send a steamer loaded with cotton to Manchester this month, the vessel to be a nucleus of a regular line to ply between the greatest cotton exporting port of the world and the one that leads the world as a manufacturer of cotton goods.

The spinners of Manchester are pledging themselves in writing to give preference to cotton brought to the city by the canal direct. "It is claimed by the canal people," says the New Orleans Times-Democrat, "that there will be a saving of 6s 8d, or \$1.65 per ton on cotton shipped direct to Manchester, equivalent to 6s cents a bale. The present cost of carrying cotton from a ship in the Liverpool docks to Manchester is 13s 8d.

The amount payable to the Manchester Ship Canal Company for canal tolls, wharfage and landing will be only 7 shillings per ton. As a special inducement to ship owners to begin loading vessels for Manchester and thus help shippers to make freight engagements, the company has agreed to charge no dues upon cotton vessels delivering their cargoes at Manchester during the season ending in September, 1894. It will be seen that Manchester is taking every possible step to induce shippers to send cotton there direct instead of via Liverpool, and the efforts they are making and the inducements they are holding out are likely to severely affect the commerce of Liverpool."

This canal will carry vessel drawing twenty-six feet. It cost about \$40,000,000 and is twenty miles long. There is another feature or two likely to develop out of the close relations of friendship and interest, certain to exist between the freighters of cotton and other supplies on one side, and the canal company and Manchester spinners on the other side. The city, of a half million, and the cluster of small cities and towns around it

a total of nearly 2,500,000 souls, need other supplies than cotton. They are large buyers in Liverpool of breadstuffs, meats and general provisions. Those will naturally go past the port of Liverpool; the cargoes for Manchester will go to that city. Then the vessels can load all Manchester goods at the wharves fronting that city, and they will unquestionably be encouraged in doing this by the canal company and the Manchester manufacturers. Why should not this prove an entering wedge for the opening of direct trade between Southern ports and the English industrial emporium? Why should not New Orleans send wheat, corn, rice, lumber and other materials direct to Manchester, as well as send cotton? That they will do this goes without the saying, and that the New Orleans ships will be, to a good ex-

tent, loaded for return trips at the point where they discharge their cargoes is equally certain. Certainly this canal is going to effect a deep, if not disastrous, cut into the trade of Liverpool.—*Tradesman*.

AGE OF INVENTIONS.

A Review of the Record Thereof.

THE "INVENTIVE AGE" is surely interested in the consideration of the age of inventions of old, as well as of the present time.

It is in regard to correctness of dates, justice of title and truthfulness of history that I desire to call attention especially, interrogatively.

The birth and growth of all great inventions is to me at all times a most interesting and absorbing subject of reflection, and in research of correct data, date and author of various inventions and inventors I have so frequently found diverse opinions and inaccuracy which is misleading to many writers, and especially to students, that it seems important at this age to endeavor to fix accurately a record of standard acceptance.

The Steamboat and the Railroad are, however, the only inventions which I desire to note briefly at present and it is a recent discussion, verbally as to the earliest successful application of steam to the boat, and journalistically as to the first iron boat, that leads me to this desire.

STEAMBOATS.

The evidence of Rumsey's success, on the upper Potomac in 1787, (not his first effort in 1784,) in application of steam is incontrovertible although it is so frequently overlooked and even disputed, (vide papers, at the Department of State, Reports Congress, Vol. 70, No. 317, pg. 6, &c., &c.)

The evidence that Harlan & Hollingsworth built the first successful iron boat in this country is, I believe, no longer disputed, but the dates, names and owners of and places of sailing of *special* boats are almost as kaleidoscopic in record as the sight of a collection of varied beautiful shells of the ocean is to the view.

Whether the Patent registration system was defective in those days or not is a question. Doubtless many others as well as myself have often failed to find any record whatever of certain patents which should appear as the most indisputable evidence. Perhaps inventors in those days were careless about record, names were changed *without record*, iron boats were built or brought over in sections from England and relaunched at various places, claiming a new nativity.

For instance, several small iron boats were sent over from England in sections; viz., the "Randolph," the "Fire Fly," the "Stockton," the "Iron Witch," &c., which history places to the credit of sundry parties in enterprise and different localities as to a home thereof and in other instances like that of the "Codorus," there is a question as to nationality of birth.

The Census of 1880, Vol. 8, pg. 196, notes that the "Codorus" was launched on the *Susquehanna* in 1825, and yet in another line, after, notes that the "Codorus" may possibly have been one of the several iron boats which were exported from England in pieces; and again (*ibid*, pg. 215.) "iron boats were first introduced in the South about 1830, the pioneer boat of the United States, the "Codorus" having been sent to that part of the country about that time."

Now here is decided ambiguity in an official document.

If launched on the *Susquehanna* the impression is made that it was built there and has been so taken frequently yet we certainly could not have built her in this country as early as 1825. Upon search through the files of registration at the United States Navigation Bureau, Treasury Department, I failed to find any record whatever of this boat, hence I doubt not that she was of foreign origin.

The first Patent issued in this country for any thing of the character of an iron boat was to F. Gregg, March 19, 1814, but was of such rough and crude character that it amounted to nothing.

There are many authorities, all differing somewhat, such as Macgregor, Laird, Napier, Woodcroft and others and in this country who have endeavored to prove their special theories but it seems as ineffectually to the public and in preciseness in respect to the origin of iron shipbuilding and individual particulars thereof as it was to influence the incredulous British Admiralty in the early "thirties" as to the practicability of floating iron.

"Do you think an iron tea pot will float?" was their rebuff, and this evolution was laid aside until 1833.

To Commodore Robt. F. Stockton U. S. N. and Mr. Francis B. Ogden U. S. Consul to Liverpool (both of New Jersey) is due the encouragement in such building and exportation thereof and also the credit of inducing Ericsson to come to this country after he was thus snubbed by the British Admiralty, a fact not generally known.

RAILROADS.

In Railroad development as in that of Steamboats, there is a great deal of mixed and clouded historical data which should be elucidated and harmonized. In one number of my "Statistical Review," I cited from authority the record of the "Robert Fulton" as the first passenger engine ever seen in this country, built by Robert Stephenson, for the Mohawk and Hudson Co., the drawings of which were dated July 4, 1831, and this engine was said to have been altered and renamed "John Bull."

I received almost immediately, from my venerable friend (now dead) Mr. Frederick Harrison of Baltimore, who was an officer of the U. S. Corps of Engineers, awayback in the twenties, the following, from his diary of that period.

"The first railroad in the United States was laid from Charleston, S. C. to Augusta, Ga. 1826-1827; The Quincy Railroad was not iron but wood string pieces, topped with bars of iron. The Baltimore and Ohio R. R. was surveyed 1827."

"The first trial trip of the English engine on the Camden and Amboy R. R. was made Aug. 5, 1829 by Horatio Allen C. E., who brought it over. This engine failed and was taken to Cold Spring, N. Y., (West Point Foundry) and successfully reconstructed by Mr. Allen and named Best Friend."

By reference to the official report of Mr. William Howard, (then also) an officer of the U. S. Engineer Corps, the above data will be found confirmed.

The National Museum have had for some time (and the "World's Fair," Chicago, also have had) the engine said to be the original engine of the Camden and Amboy R. R. of 1832, called the "John Bull," which data conflicts in name and date with the above most reliable official authority.

Now was "John Bull" our "Best Friend?"

Or was Mr. Allen's "Best Friend" an engine of three years earlier importation, and

modification, in this country? This point is of peculiar interest at the present time as the return of the said identical old "John Bull" from the Chicago Exposition has just attracted so much attention from the public en route to Washington, and drawn so much comment from the Press generally throughout the country in publication of the claim made by the Camden and Amboy R. R. to its being the very first engine in the United States.

Perhaps our friends Prof. Mason or Prof. Watkins of the National Museum can give some evidence to substantiate this claim stronger than the mere "say so" of the Press.

I submit these inharmonies of history, not in a didactic spirit, nor contentiously but interrogatively.

CHARLES S. HILL,

The "Milton."

Washington, D., C., Dec., 24, 1883.

A MYSTERY STILL.

What is Electricity? An Unanswerable Question.

TO the metaphysical mind on the one hand and to the confident ignoramus on the other, the mysterious nature of electricity offers a fruitful subject of speculation. To the latter, especially, it seems a reproach that the true nature of electricity has not long before been made manifest, and he is always prepared to dash off an explanation with much more confidence than Newton proposed his theory of gravitation. It seems inexplicable to the public at large that the mystery surrounding electricity is not dispelled. The successful business man, who prides himself upon always getting to the bottom of everything, cannot understand why this one problem, as he believes, remains unsolved, and, perhaps unconsciously thinks that if his work had been in this direction, his "hustling" abilities would have produced a more favorable result than attained by scientific theorists. It does not seem to occur to those who are impatient to have the great question, What is Electricity? answered, that we are in just as dense ignorance as to the mechanism of other phenomena. Gravitation, light, heat and chemical action are in the same category of scientific mysteries and have had centuries more of thought bestowed on them than has been devoted to the new agent. While it now seems that we may be on the threshold of one of the greatest discoveries of the human mind, yet it is possible and even probable that the knowledge of man may never be permitted to extend to the entire solution of the problem, for it is the very problem of the universe itself. Assuming what seems unquestioned, that electricity, electrical action, or what ever we may call it, has its seat in the atoms or molecules of matter, or of the hypothetical matter, ether, we are brought face to face with the same conditions that confront the cosmical philosopher. As the latter can never hope to have his material vision extend to the bounds of the universe neither can the molecular physicist hope to materially appreciate the ultimate elements of matter. Lord Kelvin has shown that if a drop of water were magnified to the size of the earth, one of its constituent molecules would only be magnified to approximately the size of a cricket ball. Bearing this in mind, the immensity of the problem which is so often flippantly referred to is evident. True, we may demonstrate the exact relation between electricity and magnetism, and may satisfactorily con-

nect these with other phenomena, and even obtain a working hypothesis that will answer all scientific needs, but the ultimate solution may forever evade human mind. Whatever we do learn, however, will not be through the speculation of metaphysicians or the guesses of tyros, but through the physical investigations of Hertzes and Teslas. While as a mental training metaphysical speculation may have its use, the absolute lack of additions to our real knowledge during the many centuries from Plato to Bacon, when metaphysics held full sway, is conclusive that nothing can be expected from this direction, and merely speculative theories in regard to the nature of electricity deserve as little consideration as is now given to the metaphysical vagaries of the Schoolmen of Middle Ages.—*Electrical World*.

ORIGIN OF INVENTIONS.

How Watts Discovered the Way to Make Shot.

In regard to the origin of many inventions some curious facts have been abduced, and it is quite true that a number of important discoveries have been made through accident, though, of course, such accidents or occurrences would have had no significance to persons whose minds had not already been, in a measure, prepared to receive and profit by them.

Before Watts, the discoverer of the present mode of making shot, had his notable dream—said to be induced by over indulgence in stimulants—the manufacture of shot was a slow, laborious, and consequently costly process.

Great bars of lead had to be pounded into sheets of a thickness nearly equal to the diameter of the shots desired. These sheets had then to be cut into little cubes, placed in a revolving barrel, and there rolled until, by constant friction, the edges wore off from the little cubes and became spheroids.

Watts had often racked his brain trying to discover some better and less costly method, but in vain. Finally, after spending an evening with some companions at an ale-house, he went home, went to bed, and fell asleep. His slumbers, however, were disturbed by unwelcome dreams, in one of which he was out with "the boys," and as they were stumbling home it began to rain shot—beautiful globules of polished, shining lead—in such great numbers that he and his companions had to seek shelter.

In the morning Watts remembered his curious dream, and it obtruded itself on his mind all day. This led him to speculate as to what shape molten lead would assume in falling through the air, and, finally to settle the matter he ascended to the top of the tower of the Church of St. Mary at Radcliffe, and dropped slowly and regularly a ladleful of molten lead into the moat below. Descending, to his surprise and delight, he took from the bottom of the shallow pool several handfuls of the most perfect shot he had ever seen. Watt's fortune was made, for from this exploit emanated the idea of the shot tower, which ever since has been the only means employed in the manufacture of the little missiles which are so important to sportsmen the world over.

Agents wanted for the Inventive Age in every city and town in the country. People subscribe on sight. You can earn money easily in acting as our agent. Highest commission paid to live young men.

An Electrically Illuminated Ballet.

Professor Gustave Trouve who is the most prolific electrical inventor of France, and one of the most wonderful inventive geniuses living to-day, is industriously at work not only on his great flying machine, electric launch, electric motor, electric lamp



and various other important devices, but he still continues to employ himself and amuse the gay world of Paris by producing new and marvelous novelties for the French stage. One of the most superb and surprising effects of Prof. Trouve's inventions is his electrical illumination of a corp of French ballet dancers. The magnificent costumes of these girls are decorated in a most artis-



tic manner with beautiful flowers and diadems which carry within their makeup miniature electrical batteries which are controlled by each individual, in the matter of illumination. The effect of this electrical ballet on the Parisian theatre goers is electrical indeed. As a spectacle that has attracted all Paris and as a drawing card at a theatre it has never been beaten. We give in these columns two illustrations of

Trouve's work, one is an armed lancer the other a dancing fairy. One of the remarkable ballets was composed of 25 beauties, each one representing a different flower and each flower being brilliantly illuminated by Trouve's device. It is said that the ballets are superb and surprising and produce an incomparable effect.

Through Cars to New Orleans.

Among the many important improvements in the Baltimore and Ohio Railroad train service is the addition of through Pullman Sleeping Cars from New York to New Orleans, via Philadelphia, Baltimore, Washington, and the famous Shenandoah Valley route, passing through Roanoke, Knoxville, Chattanooga and Birmingham. The train leaves Baltimore, 10.07 P. M., and Washington, 11.10 P. M., reaching Roanoke at 7.50 A. M., Knoxville, 3.52 P. M., Chattanooga, 8.00 P. M., Birmingham, 11.13 A. M., and New Orleans, 12.45 P. M.

This train is very handsomely appointed, being vestibuled throughout, and has Dining Car service New York to Chattanooga. At Washington a Pullman Sleeping Car, which runs through to Memphis, is added to the train.

THE USE OF COMPRESSED AIR.

It Is Growing In Favor Everywhere.



large number of experiments with compressed air are continually being tried. Among the uses which have never been reduced to the practicability of commercial requirements, I am reminded of an experiment which was tried some years ago, before the small steam racing crafts of to day were contemplated. A steamer was seen one day to pass through the Kill von Kull at the then extraordinary speed of twenty-five miles per hour. This was accomplished by means of two air-compressors pumping air beneath her hull, thereby imparting great buoyancy. Unfortunately the swell from her rapidly revolving paddles was so great as to wash over piers and wreck small boats, and it was even alleged that it injured oyster-beds in the vicinity. A drag was adopted to keep down the swell, but the expense of operating in this manner was too great, and the project was abandoned. In addition to the various applications of compressed air already enumerated, it is employed to operate the steering-gear of vessels, to supply divers in submarine operations, to mold patterns in foundries, and a western railroad is reported to clean the seats of its passenger-cars with jets of compressed air. Physicians use air largely for treating patients by means of a spray, and hospitals are equipped with chambers in which the patient breathes air pumped in at a pressure of thirty to forty pounds per square inch. In some of our large buildings any depreciation of pressure on the hydraulic-elevator tanks is replaced by means of compressed air.

In fact, there seems to be no limit to the employment of this power, and inventions in the success of which it is an important factor, and new methods of performing old tasks which it renders possible, are continually being introduced. And with the recent improvements in the direction of increasing the economy and efficiency of the prominent types of air-compressing machi-

nery, and the further advantages realized from developing increased power by re-heating the air, many foresee the era when a central plant will be established and a compressed-air main will be situated under every street, operating mills and factories as in Paris and Birmingham; ventilating buildings in summer and warming them in winter; preserving perishable merchandise in cold storage; operating elevators, grinders, pumps, saws, printing-presses, lathes, and the countless other machinery of commerce. Others even go further and look for its introduction into houses, the same as gas and water, for ventilating, for warming in winter and cooling in summer, and for operating lifts, sewing and washing-machines, and even clocks.

In compressed-air we have a power ever ready to do our bidding, summoned or dismissed by the simple turning of a valve. It operates in place of steam without the least change of plant, obviating the employment of engineers and firemen, doing away with boilers and their accompanying disadvantages of waste steam, smoke, ashes, dirt, dust, risk of explosion, disagreeable odors, the expense of cartage, increased rates of fire insurance, water tax, etc. The old maxim that "importance oft attaches to trifles light as air" becomes doubly true when

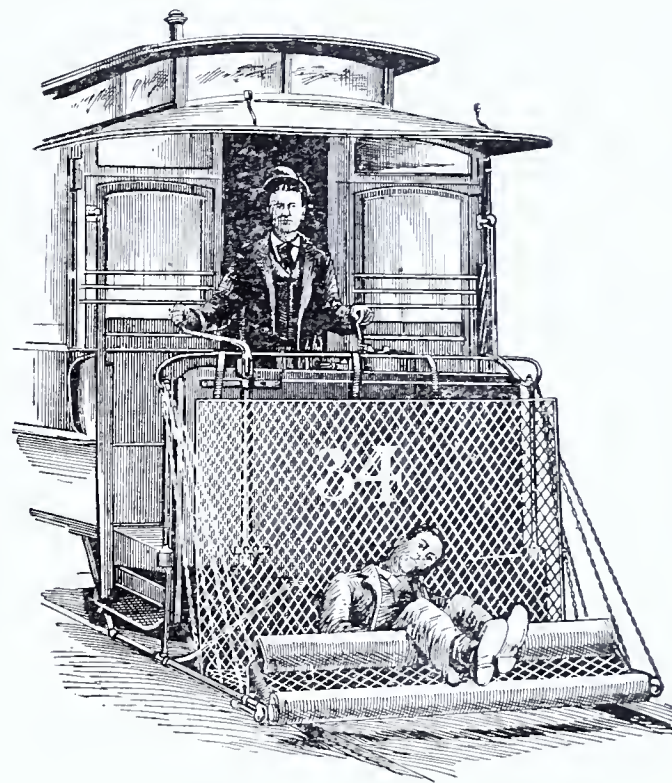
The frame is made of one inch gas pipe, hinged in such a manner that it can be folded up when the car is reversed, or for storage purposes, occupying a space of only ten inches.

Wire netting covers the bottom and extends upwards at a right angle and in front of the car platform, being about six inches from the dashboard, the horizontal portion of the netting and frame being six inches from the track or roadway.

The wire netting is attached to the frame by springs, thus preventing a person caught up in the fender from receiving any undue shock or injury.

Across the front end of the fender there is an elastic steel frame covered with a rubber tube five inches in diameter. This frame and tube is connected to the ends of the fender frame by two short springs, making a very elastic buffer; and, as this buffer is what a person standing on the track would first come in contact with, owing to its yielding nature and to the fact that there is nothing solid across the front end of the fender, (the end of the frame being practically open, as the cross bar is placed back eight inches from the outer end), THE BLOW STRUCK IS A CUSHIONED ONE.

There is also a second rubber guard ten



we consider that this atmosphere, always so necessary to human existence, is being concentrated and harnessed to the service of mankind in so many new and widely-different ways.

W. P. PRESSINGER.

THE ROBINS LIFE GUARD

A Novel Device for Street Cars.

Some very successful experiments have been made recently with the Robins Safety Fender for street cars. While experimenting in Philadelphia, a boy was placed upon the track about fifty feet in front of the car, which was started and running at full speed struck the youngster and picking him up without a scratch carried him along in the guard until the car reached its destination, several tests of a like nature were made and in every instance the Safety Fender did its work to perfection. We give on this page an illustration of the Fender after it had caught its burden.

The Fender consists of an iron frame, bolted to the under part of the car body and extending in front of the car 3 feet, 6 inches.

inches high, attached to the bottom netting eight inches from the front end of the fender. This guard has a spring-controlled rearward movement; and, when in position stands upright. Its object is to prevent a person from being thrown out of the fender after having been caught up.

The horizontal portion of the Fender can be easily and quickly transferred from one end of the car to the other, the actual time required being one minute. This will greatly reduce the cost of equipping cars that run in both directions.

The Age's Christmas Offer.

The best 1893 Christmas offer you will hear or read of — Picturesque Washington, 260 pages and 136 fine illustrations, former price \$2.00; Autograph of Washington giving all streets, parks and public buildings, price 25 cents, and THE INVENTIVE AGE price one dollar per annum, all for \$1.25. Send us \$1.25 by mail and you will receive the three, making the finest Christmas gift for the money ever presented to a friend. We have bought the edition of Picturesque Washington. Send before it is exhausted and send in time for Christmas.

A MUSICAL GENIUS.

Some Points About the Great Gounod.

A more striking contrast to the tragic circumstances of the death of the master, for whom Gounod's admiration was boundless, than was shown by the universal sorrow expressed at the death of the French composer it would be difficult to imagine. Mozart was buried among the nameless poor, with no friend to shed a tear, and no cross or stone to mark the exact site of his resting place. Gounod's remains have been accorded the highest honors which his country can bestow.

The allusions of the two composers to approaching death were remarkable. Only a fortnight before Gounod died a representative of the *Revue de Famille* paid him a visit and asked him to write the article on "Marie Antoinette as a Musician" for M. Jules Simon's magazine. In the course of conversation he said to his interviewer:

"I have never been able to do any work that my soul did not thoroughly feel. This article does not come home to me; and then, mark you, I am strictly enjoined to abstain from any kind of work. You must know that some time ago I had an attack of paralysis. Now, when I look at you in this way I can only see one half of your face. I know I look robust; but, as St Paul says in his Epistle to Timothy: 'I am now ready to be offered, and the time of my departure is at hand. I have fought a good fight: I have finished my course: I have kept the faith.' I have had several attacks already. The next!—"

He repeated in Latin, with emphatic reverence, the words he had quoted in French, then relighted his pipe and went on talking dreamily, but his mind was evidently turned to the great problem he was so soon to solve. Referring to music and its spiritualizing effects on the soul, he continued:

Music gives a foretaste of the immateriality of the future life.

As the journalist was taking his leave Gounod asked him if he was married. The reply coming in the affirmative, Gounod took out his pruning knife and cut a number of roses, adding, "Give her these flowers as a souvenir of your first visit to an old man."

Like most great men, Charles Gounod had his amiable weaknesses. His briarwood pipe was one of them; and although he wore a ring modeled from a relic found in the Roman catacombs on his finger, he frankly confessed that he received finest inspirations while playing "patience" at the little card table placed in the shadow of the organ.

He loved his pipe dearly. In this connection the following words of his have an interesting bearing on tobacco smoking and its effects:

I admit sincerely the truth of Tolstoi's opinion in all that has to do with the intellectual faculties. I think that the habit of using tobacco produces a sluggishness of these faculties, that this sluggishness follows upon the habit, and by abuse may reach even to atrophy. I am not so sure that it could positively result in the annihilation of Conscience, whose witness is too startling to undergo so easily an eclipse so disastrous. I say Conscience, be it noted; I do not say Will. Conscience is a Divine decree; Will is a human energy. The latter can be weakened by abuse of the organs; the former, however, seems to me quite beyond all effect of the sort, because it creates the responsibility without which man

ceases to be amenable. I have smoked a great deal. I do not recall that it has ever modified the judgment of my conscience on the morality of my acts.

Gounod's punctuality and exactitude were proverbial. If anything happened to prevent him keeping an appointment he always wrote so that you should not make your call for nothing. He attended to his own correspondence. "Too many persons talk to me of their private affairs for me to let a third person know about them."—*December Review of Reviews*.

A New Kind of Building Material.

The new kind of building material, some time since announced as a proposed substitute for ordinary stone or brick, is now receiving special endorsement on account of its freedom, under various and repeated tests, from the usual liability to crack or fracture. To insure this property, with the other essential adaptations, silicic acid is used, powdered and cleansed from all impurities; five to ten per cent. of this is mixed in warm river or rain water, and this is applied to slaked or well burnt lime, or added to hydraulic lime, the resulting product being mixed with sand and small portions of fluorspar. This mixture is cast into moulds, in various shapes as may be desired, and, after removal, the castings are left to dry from twelve to twenty-four hours, which brings them to a condition as dry is atmospheric air; in this state they are brought into a steam boiler and steam blown through so as to drive out all air, after which the boiler is hermetically sealed up and steam let in under a pressure of ten atmospheres. In this high pressure steam bath the stones remain for forty-eight to seventy-two hours, afterward being submitted to a bath of boiling and saturated chloride of calcium for six to twelve hours, also under a pressure of about ten atmospheres, in the same boiler, and the condensed water may be used for the bath. The stones are allowed to dry in the open air, or, more quickly, by circulating steam inside the boiler after the chloride of calcium has been withdrawn and prior to taking out the stones.

Gas Engines for Street Cars.

Gas engines for street cars have been used for some time in Chicago, and recent experiments with such motors have been carried out in Switzerland and Germany. At Neuchatel an eight horse-power, double cylinder motor car has been in use for some months. The car seats about twenty passengers and hauls a trailer, the speed maintained being about six and one-fourth miles an hour. The gas for the engine is carried in tanks under a pressure of about 150 pounds a square inch. The local street railway company has ordered a number of such cars for regular use on its lines and made arrangements with the local gas company for a supply of gas. At Dresden a somewhat similar car, equipped with two gas engines of seven horse-power each, is in use. Both engines are coupled to one shaft, from which power is transmitted to the axles by a friction clutch arrangement. The car carries four tanks charged with gas under a pressure of about ninety pounds a square inch. Starting and stopping is said to be accomplished without difficulty, even on grades of one foot rise is twenty foot of length. At still another town gas motor cars are to be tried; this is Nordhausen, where a short experimental line is being fitted up.

Machinery of the Human Body.

In the human body there are about 263 bones. The muscles are about 500 in number. The length of the alimentary canal is about 32 feet. An exchange adds that the amount of blood in an adult averages 30 pounds, or fully one-fifth of the entire weight. The heart is 6 inches in length and four inches in diameter, and beats 70 times per minute, 4,200 times per hour, 100,800 times per day, 36,792,000 times per year, 2,565,440,000 in three-score-years-and-ten, and at each beat two and one-half ounces of blood are thrown out of it, 175 ounces per minute, 656 pounds per hour, and seven and three-quarters tons per day. All the blood in the body passes through the heart in three minutes. This little organ pumps each day what is equal to lifting 122 tons one foot high or one ton 122 feet high. The lungs will contain about one gallon of air at their usual degree of inflation. We breathe on an average 1,200 times per hour, inhale 600 gallons of air, or 24,000 per day. The aggregate surface of the air cells of the lungs exceed 20,000 square inches, an area nearly equal to the floor of a room 12 feet square. The average weight of the brain of an adult male is 3 pounds 8 ounces, of a female 2 pounds 4 ounces.

The Highest Honors.

Three medals and diplomas were awarded by the Jury at the World's Fair to the Kimball Pianos, manufactured by W. W. Kimball Co., Chicago, Ill. These Pianos are rapidly coming into popularity in the East. Many of them have won their way into homes in our city.

Echoes of the Fair.

The "Society of the Columbian Guard" is an organization formed by the survivors of that famous aggregation at once the admiration and the target of abuse of all tourists to the Fair. They do not intend to lapse at once into oblivion if they can help it.

Some of these exhibits like that of New South Wales have been displayed at the Paris Exhibition and are extremely valuable.

The question of demolition is now the burning thought of the Fair authorities. The great buildings have to be removed and the park restored in due season, and thousands of dollars will have to be expended for the purpose. It is said that it will require \$40,000 to tear down and remove the Mackaye Spectatorium, that gigantic frame work which promised so much splendor and which passed into a receiver's hands when half completed and has remained in an unfinished and unsightly condition ever since.

North Attleboro, Massachusetts, is destined to have no lights on her streets this Winter. A while ago a special town meeting appropriated \$50,000 for an electric light plant. It was supposed the plant would be in readiness for use by November, for lights, but the building is not yet complete. The boiler has not been put in position, and there are other important things in connection with the plant that remain unfinished.

The Austrian authorities have issued a rescript in which they call attention to the law that physicians' prescriptions shall be written in a legible hand.

INVENTION A BLESSING.

Machinery Does Not Increase the Unemployed.

We are yet in the first age of the history of industrial progress. The feudal, the slave and now the wage system have been successive steps. The natural history of industrial art is properly divided into hand work and machine work. Prior to the dawn of the age of machine production there was but little pressure upon labor.

"A brief review of hand industry is interesting, though it must of necessity be based upon comparatively meager material, ending, indeed, about 1760. The evidences of manufactures in the prehistoric age are numerous. The prehistoric man could build boats and knew how to make a rudder to steer them. He must have known how to make tools for such tasks. The golden candelabra of the Israelites must have been hammered or cast, but there is no record of how it was done. Yet that is not so strange, for to-day in a catalogue of tools or machinery one would not expect to find a description of tools and of the process of making.

"Work such as the ancient Assyrians did in bronze would attract attention to-day if could be reproduced. The ancients left little to be learned of hand work. Prior to the discovery of the Assyrian specimens none knew the art of casting copper upon a framework of iron. The Assyrian carved ivory, wove marvelous things and made bronze bits almost identical with those in use to-day. The Chinese had marvelous knowledge of tools and the industrial arts centuries ago. The middle ages produced some of the great inventions—gunpowder, firearms, movable types.

"The condition of the people during the hand-labor period changed but slightly. Wherever the handworker was found he occupied the lowest position in the social scale, and his work was done at home amid squalid surroundings. Knowledge of the truth concerning hand labor can only cause the workers of to-day to thank God that machines have superseded hand labor. The age of machinery has brought general prosperity.

"Inventions brought the factory, and that stands to-day for industrial production. The factory is the thing in which mathematics and mechanics find their highest development. Machinery has created employment for many, has made of the unskilled workers skilled laborers. The factory is revolutionizing agricultural as well as all other work. Many products of the soil go from seed to store room without touch of a hand.

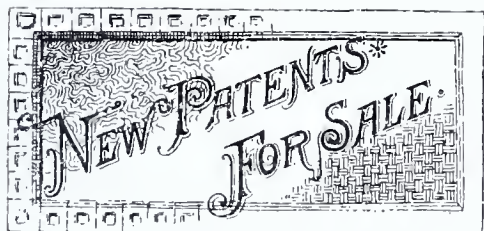
"It may be said that machinery has increased the number of unemployed. This, I think, is not true. England has the most machinery and the greatest ratio of people employed to population. Russia has the least machinery and the greatest ratio of unemployed. Machinery means the survival of the greatest number in the greatest comfort. Wages have doubled since the day of hand work, and while prices of some necessities have increased most have decreased.

"Had the hand workmen of the Pyramids built the Brooklyn Bridge they would have earned in money of the same value 2 cents a day against \$2.20 averaged by the men who worked on the structure. Krupp is the greatest peacemaker. The great engines of war lead to peace. Machinery has done it all. It is industrial progress."

CARROLL D. WRIGHT.

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We call the attention of all persons interested in buying, selling, manufacturing, and developing patents to the following "Want" and "For Sale Lists." They are filled with announcements concerning valuable patents, giving first-class opportunities to all who have anything to do with inventions. The entire page will well repay a careful perusal. Full address of inventor given in each announcement.



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Patents No. 506,078, 506,080. A valuable Sleigh and Sleigh Propeller, patented Oct. 3, 1893. Will sell outright or on royalty. Address, F. A. Schaefer, Truckee, Cal.

SPECIAL NOTICE.

On the 28th of December, after this issue of the paper had been printed, THE INVENTIVE AGE passed into the hands of the Inventive Age Publishing Company, Mr. DuBois remaining in the new corporation, but relinquishing the active management. It had been the intention of the former management to reduce the size of THE INVENTIVE AGE somewhat, and furnish it for 50 cents a year. This announcement was printed on page 11 of the January number of THE INVENTIVE AGE, and published before the change of management. It is the purpose of the new management to enlarge the scope of THE INVENTIVE AGE and place it in the front rank of class journalism. It will be improved typographically, new features of interest to inventors, mechanics and manufacturers will be added, its value to all readers increased, and the subscription price of *The Inventive Age* will remain the same, \$1.00 a year.

This special announcement to the readers of THE INVENTIVE AGE is made necessary because of the printing of the January number before the change of management occurred.

CAPEHART & JEWELL, EDITORS.

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send one copy post paid of our "Famous Picturesque Washington" containing nearly 150 handsome illustrations and two hundred and sixty pages of interesting matter and the INVENTIVE AGE one year. This book used to sell at the book stores in Washington, Philadelphia and New York, for Three Dollars a volume. It is the best thing for the money ever offered, and everybody who gets it says so with enthusiasm.

A Tower of Light.

The central figure of the Mid Winter Exposition soon to open in San Francisco will be a magnificent Tower of Light which will afford a grand view of the city, the Golden Gate and bay and surrounding country.

As the plans are now prepared the main buildings will face a depressed Court of Honor, capable of great artistic landscape treatment, in the center of which the tower will be located. This will be a skeleton structure 50 feet square at the base and rising to a height of 260 feet, with four *etageres* or landing places. Four Moorish pavilions, 60 feet high and gorgeously decorated in colors, will occupy the spaces between the supports of the tower at the base. The first floor will be 80 feet from the ground, the second 140 feet, the third 210 feet and the fourth 260 feet. All these will be open to the public, except the highest one, from which the powerful search lights will be operated. While the principal purpose of the tower is to afford light, it will be used as a grand band stand, from some part of which music can be heard at all times. An immense gold ball caps the tower and on this ball will be the figure of a bear, the emblem of the State of California.

The Electric Motor in the Woods.

Trees are felled by electricity in the great forests of Galicia. For cutting comparatively soft woods, the tool is in the form of an angel, which is mounted on a carriage, and is moved to an felled tree and revolved at the same time by a small electric motor. As the cut deepens, wedges are inserted to prevent the rift from closing, and when the tree is nearly cut through, an ax or a hand saw finish the work. In this way trees are felled very rapidly and with very

Water Power System.

is genius has succeeded in connecting the power of rivers with the current runs strongly in one place where there is no

Three canoes are anchored side by side in midstream. Because two paddle wheels hang on the shafting. The water rushing past the wheels and the power thus conveyed by gearing to a drive shaft, one of the boats, and from there transmitted to the shore by wire is provided to keep the wheels at right angles with the current at all times. The wheels may be submerged, the canoes are partially submerged, the water-tight compartments. The surface area of 30 square feet when wholly immersed in a stream, must withstand a considerable

The arrangement is such that the turning effect is about equal to that of a water wheel, and is not taken from the old grist mills run on the Tiber two thousand

Edison's Better Half.

It is a great thing for an inventor to have a truly helpful better half. In this respect Edison is greatly blessed. He has an ideal home at Orange, N. J. and it is graced by an ideal wife. Mrs. Edison before her marriage was Miss Nina Miller daughter of Lewis Miller, the Millionaire inventor and leading light in the Chautauqua movement. Edison met her in Boston, where she was studying music, sometime in 1885. He fell desperately in love, and within six months they were engaged to be married. The wedding took place in February, 1886. Mrs. Edison is tall and stately and has brown eyes, dark hair and a clear olive complexion. She is perfectly proportioned and very graceful and altogether a charming woman.

The Edison home, Glenmont, is in Llewellyn Park, a suburb of Orange, and one of the prettiest places in the Orange Mountains, being situated on the eastern slope of Eagle Rock, whence can be obtained one of the most beautiful and extensive views to be had in the neighborhood of New York. The observatory at Coney Island, twenty miles away, can be discerned from there on a clear day, and charming glimpses of the intervening country. Glenmont itself is luxurious and beautiful. Its furnishings and decorations are in the best of taste, and Edison has a comfortable, big library in which a book-worm might dream away his existence in contented peace and idleness.

Edison has no time for that kind of dreaming, however. His province is rather to make dreams practicable, and to that end he spends most of his time in his laboratory and workshops—a group of red brick buildings about five minutes' walk from the house. They say that Mrs. Edison has often to go down to the laboratory to remind her husband that it is meal time, for he gets so absorbed in his experiments that he quite forgets the necessity of eating.

Hereditary Disease.

We know that features, form, frame, peculiarity of constitution, susceptibility to certain agents, not to speak of character, mental and moral, the passions and the intellect, are often derived from progenitors many steps upwards in the ancestral tree. Individually we are combinations of many ancestors. The actual traits of the parents may or may not be seen in their offspring, and it is more common to find that one or two only are represented in each child. The remainder are doubtless derived from some ancestor long forgotten, whose intellectual powers or defects, infirmities or vigour of body, whose faults and follies, whose brilliant powers or miserable failings, may be reflected in a remote descendant, as he himself has derived them from some distant ancestor. We are accustomed to say that gout may skip a generation, and why may not it skip four or five? Hereditary tendency is probably of far more remote origin than is commonly supposed, and is a reflection of the tendencies of untold numbers who have preceded us in the family tree. It is a frightful thing thus to look back on the sins of our forefathers and to recognise the transmitted punishment, but it is in accordance with other facts of moral origin and highest dictation. It is sometimes asserted that when people live together, or are intimately associated, they grow like each other, and we know that schoolboys are apt to catch any peculiarity of habit or expression of their tutor or schoolmaster.

This is undoubtedly the case, but it is a very different thing from heredity. Physical peculiarities acquired accidentally are not transmitted. A man loses a leg, but his children are born with their proper complement. For generations past it has been customary to cut off the ears and tails of certain breeds of dogs, but it has not resulted in the establishment of a race of animals unfurnished with these useful appendages. On the other hand, when by a curious freak of nature a man is born with a supernumerary finger or toe he may transmit this peculiarity to his children. It sometimes happens that children of one sex exhibit an hereditary taint, whilst those of the opposite sex escape it. The boys "take after" the father and the girls after the mother, and a tendency to disease may be more or less powerful as the child resembles one or other parent.

Cyrus H. McCormick exhibited his mower at the London Fair, in 1851: at that time every acre of hay cut, cost a days hard work for one man. Now a boy can ride all day on a spring seat and cut ten acres of hay and feel like turning hand springs in the evening. McCormick's mower made him a millionaire and saved millions countless days of hard labor.

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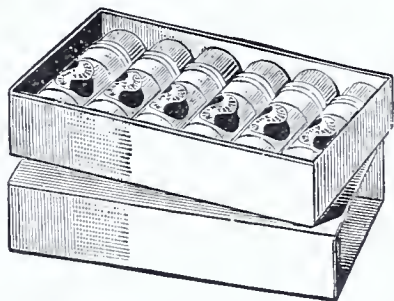
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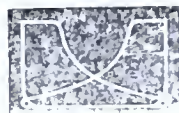
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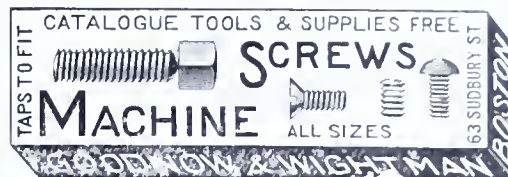
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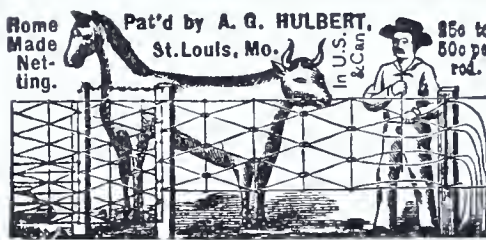
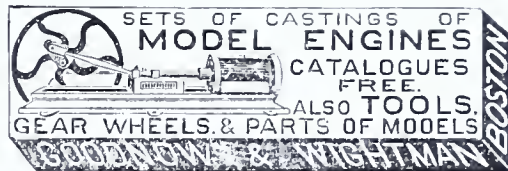
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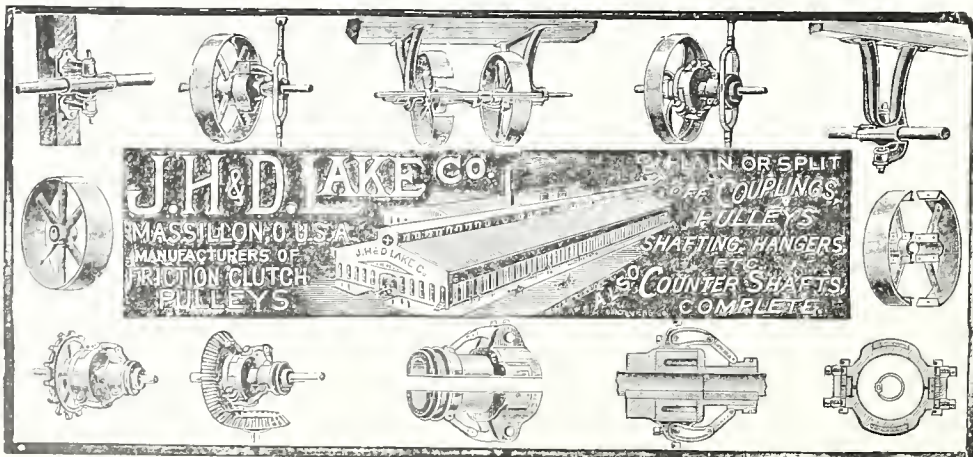
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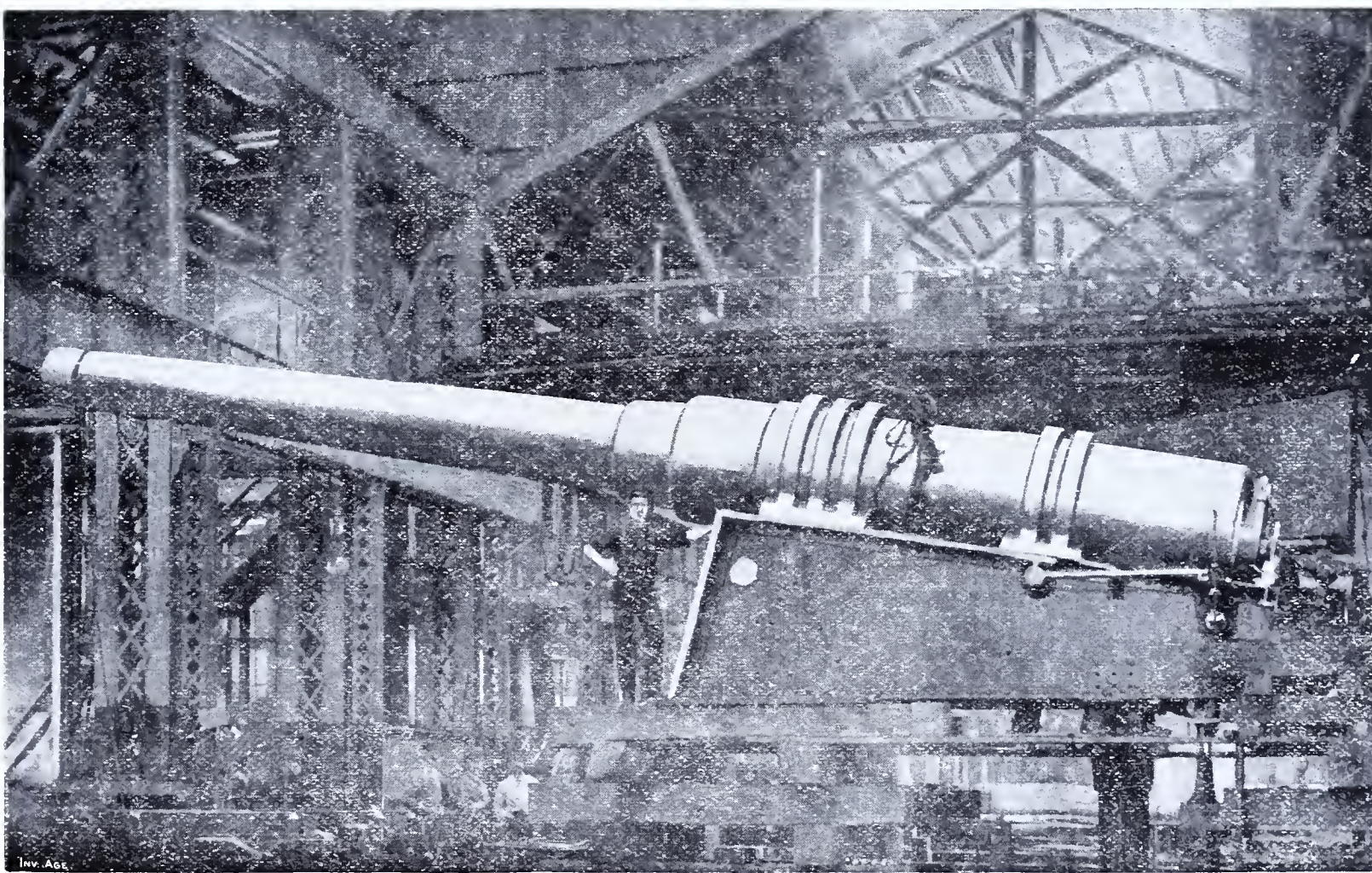
Being Made at the Washington Navy Yard for American Battle Ships.

Some facetious writer in *London Fun* has outlined something about the destructive features of twentieth century ordnance. He dates his article A. D. 1930, and refers to a million-and-one-ton cannon constructed for English coast defense. The manufacture of this ponderous cannon is estimated to have cost the English Government 150,000,000,000 pounds sterling, and to move it one inch entailed an expenditure of 90,000,000 pounds sterling. An impending war with Europe suggested an experiment as to the practical utility of this ponderous implement of warfare. It was estimated that it would cost 10,000,000 pounds sterling to turn the muzzle of the cannon toward Europe and an additional 3,000,000 pounds sterling to fire a single round. After these estimates were made, a more serious question arose. Would the British Isle withstand the recoil? But while in the midst of determining this question it was discovered that the powder chamber in this great gun was defective, and that it would require six years to complete the needed repair; and the English Government was compelled to bury the ponderous cannon

as it dwells in his memory, with the steel rifle in accompanying illustration, and determine for himself if there is not apparent efficiency and potency in its cold, glittering, gigantic proportions. The engraving presented displays a completed gun as it appears at the United States Navy Yard Gun Factory in Washington, D. C. This giant "peace-maker" is only one of ten guns of this calibre which have been manufactured at this foundry by this great and progressive nation. These guns are very costly weapons of warfare, as they demand a charge of powder weighing 550 pounds and throw a projectile weighing 1,100 pounds a distance of thirteen miles, when properly elevated. They are designated as 13-inch breech-loading rifles. Twelve of these great guns will be made by the Government. Ten have already been

The first firings will be to establish a service of powder charge, and in the early experiments a low charge will be used. Subsequently the charges will be gradually increased. It is estimated that 500 pounds of powder will hurl the 1,100-pound projectile at the rate of 2,000 feet per second, and the force of the blow at the muzzle of the gun will be sufficient to displace nearly 40,000 tons one foot. The huge projectile, which must be placed in the breech of the gun by means of a derrick, will be fired at a steel plate after the service charge has been determined. Some ordnance experts think a shell forced from one of these great guns by the explosion of 500 pounds of powder should pass completely through 25 inches or more of steel at any distance within a thousand yards of the muzzle. The enormous tensile

strength of these great engines of destruction is obtained by using the hardest quality of steel both in the manufacture of the rifled tubes and the jacketings, or encasings, which they receive. The operation of jacketing one of these rifles is a very important one and involves nicety of measurement and manipulation. The principle of heat expansion and contraction is employed in the most scientific sense and calculations are made with extreme precision. The long steel tube is placed verti-



THE LARGEST GUN EVER MANUFACTURED IN AMERICA—38 FEET LONG, 13-INCH CALIBRE.

beneath a mound of earth and concentrate the combined strength of its army and navy to defend that which represented the wealth of the nation. So much for the pleasantries of the contributor to *London Fun*.

One of the distinguishing features at the World's Fair was the great Krupp cannon. Thousands of people "stood at gaze" when contemplating the exhibit of this great German gunmaker, not realizing that in this country, and by American genius and skilled workmen, we were producing cannon of quite equal power and efficiency. Let any one who visited the Exposition compare the size of the Krupp gun,

practically completed. They are intended for the battle ships Oregon, Indiana and Massachusetts—four for each of these vessels. Preparations have been made for the test of these cannon. They will be shipped from Washington to the Indian Head proving station. These tests will include the mounts and charge of powder required to secure their greatest efficiency. Powder has been specially prepared for the purpose, and while the power of these rifle cannon is yet somewhat problematical, experts have estimated (based upon experiments with guns of less calibre), that they will produce satisfactory results.

cally in a pit of sand. The jacket is then heated to about 500 fr. This expands the bore of the jacket only a few thousandths of an inch, but when it is carefully placed upon the tube and permitted to cool the jacket contracts and forms itself about the rifle much more firmly than thousands of bolts and rivets could possibly make it. In fact, the jacket actually diminishes, by contraction and pressure, the bore of the inner tube about twelve one-thousandths of an inch. When these jacketing operations are commenced there is always present quite a number of

(Continued on page 9.)

The Inventive Age

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Correspondence with inventors, mechanics, manufacturers, scientists and others is invited. The columns of this journal are open for the discussion of such subjects as are of general interest to its readers.

Technical matter is particularly desired. We want practical information from practical men.

Nothing will be published in the editorial columns for pay.

The INVENTIVE AGE is thoroughly independent, and has no alliance with any patent attorney or patent bureau. It is the friend of the inventor and the American manufacturer.

Advertising rates made known on application. Special facilities for furnishing cuts of any patented article together with descriptive article. Business specials 15 cents a line each insertion, 7 words to the line. No advertisement less than 50 cents.

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WASHINGTON, D. C., FEBRUARY, 1894.

NEW DRESS, NEW MANAGEMENT.

THE INVENTIVE AGE appears this month in a new dress and under new management. Under the guidance of its founder, Mr. James T. DuBois, THE INVENTIVE AGE, now in its fifth year, already occupies a leading position, and is a magazine of recognized standing in the scientific, industrial, mechanical and inventive world. It is the purpose of the new management, if there be virtue in enterprise, energy and pluck, to still further extend the field and scope of the magazine, and place it in the front rank of high class technical journals of the country. It will strive to promote the harmonious relations that must naturally and necessarily exist between inventors and manufacturers; it will aim to be a true reflex of the inventive genius of the age, and its columns will be open to the discussion of such questions as may properly belong to a journal of this class. It will, through its corps of contributors of recognized standing and ability, disseminate instructive and important information regarding valuable inventions, useful discoveries and scientific principles. It desires to co-operate with practical men who have practical ideas. It wants their advice, suggestions and assistance. THE INVENTIVE AGE is not the organ of a patent bureau, or ally of any patent attorney. It is the friend of the inventor and the champion of his interests. In this respect the AGE has been divorced from all its former conditions. Its advertising columns, heretofore exclusive, will hereafter be open to all announcements of a legitimate and reliable nature. The new management feels certain that the mutual relations of confidence and respect heretofore existing between THE INVENTIVE AGE and its readers will continue, and to that end it pledges sincerity of purpose and concentration of energy, effort and desire.

MR. ROBERT GRIMSHAW, M. E., of New York, author of "Tips to Inventors," one of the most popular works for inventors and mechanics ever published, and regular contributor to the INVENTIVE AGE, will leave for Europe this month to make a tour of the continent. The INVENTIVE AGE is pleased to announce that during his absence Mr. Grimshaw has consented to continue his contributions to the columns of this journal each month.

THE dispatches tell of the sudden disappearance of Walter Campbell, president of the Illinois Electrical Forging Co., with something like \$100,000

collected from stockholders in the company. The Illinois concern was the outgrowth of the exhibit at the World's Fair of a model of welding by means of electricity, owned by the Boston Electrical Forging Co. Campbell obtained the right for the state of Illinois by giving the Boston concern 25 per cent. of the stock. Campbell then sold a portion of the stock to other parties and departed for parts unknown.

It now seems likely that work on the proposed Washington and Baltimore electric railway will soon begin. The distance is something like thirty miles. It is the purpose of the company to equip the line with model vestibule trains, make the trip between the two cities in one hour and the rate \$1.00 for the round trip. It is also reported that the plan to connect the cities of New York and Philadelphia by a trolley line has assumed definite shape, and if a success, it may be assumed that the connection of New York and Washington by an electric railway is only a question of short time.

THE January number of the *Engineering Magazine* was distinctively a souvenir number containing a retrospect of the World's Fair. It was profusely illustrated with half-tone full page cuts of interior and exterior views of the buildings of the White City and the various displays made in all industrial lines. The matter was of a high order. The article by Prof. R. H. Thurston, director of Sibley college, Cornell University, "An Era of Mechanical Triumphs," possesses especial merit, reviewing as it does the remarkable progress made in mechanics and the useful arts by the inventive genius of the nineteenth century.

THE threatened generosity of Krupp, the great German gunmaker, as well as his business acumen having failed him, the exhibit at the World's Fair has been shipped back to Germany. At first it was reported that the big 120-ton cannon would be presented to the city of Chicago and mounted on an artificial island, where it could sweep the inland sea and western metropolis, but later negotiations looking to the sale of the monster gun to the government were inaugurated. The fact being discovered that this government is now making monster coast defense guns of equal or superior merit to the Krupp manufacture brought all such negotiations to an end and the big gun goes back to Germany.

By United States Patent No. 186,787, issued January 30, 1877, Alexander Graham Bell secured a patent on the first practical telephone. Two years previous to that time he had secured a patent on the method of transmitting speech by electrical action but not until 1877 did the telephone reach a state of general utility. On the 30th of last month the patent on the electric telegrapher in the Bell telephone patents expired. These patents were very broad in their construction, but their validity was confirmed by the Supreme Court of the United States, the case being one of the most famous and closely contested ever before that body. The expiration of these patents and the free right of the people to use them will not, however, effect a general reduction in cost of telephone service. The numerous improvements on the original Bell telephone, on which the patents will continue for several years, make the telephone of to-day entirely dissimilar to that of ten years ago. The attempt will doubtless now be made to perfect a telephone system without infringing on patents now controlled by the Bell Company, but it will prove a difficult task. The fact that they intend to guard what they assume to be their rights and resist any attempt at successful rivalry is evidenced by the publication of warning on their part, in which the decision of the Supreme Court is cited.

THERE is much logic in the argument that the great reduction in prices of raw materials as well as manufactured articles from 1880 to 1893, is due largely if not principally to the work of the American and foreign inventor. As the *Chicago Tribune* recently put it, the lowering of prices is the work

of the man whose busy brain is studying eternally how one man can be enabled to do the work of two, or four, or five or ten, by means of a machine driven by steam power. Prof. Thurston of Cornell University also makes a startling comparison between the past and the present when he says that now one Dakota farmer, reinforced by the power of horses and steam, supplemented by the invention of the reaping machine, produces between 5,000 and 6,000 bushels of wheat; and this is converted into a thousand barrels of flour by the labor of another man for the period of one year; while the labor of two other men deposits this flour on the dock at New York. A century ago, ten persons made 48,000 pins in a day. Now seventy machines with three men in attendance produce 7,500,000 better pins. The intelligent mechanic in mill and factory is all the time on the lookout for some labor-saving device, by the aid of which he can do more in less time with less trouble. No sooner is an idea wrought out and embodied in a machine than many men begin working on the problem how it can be improved and made more effective. Few outside of the Patent Office have the least idea of the amount of brain power which is expended steadily on this problem of the substitution of the machine for the man. The public thinks of only a few great inventions—the cotton-gin, the power-loom, the lathe for turning irregular forms, the sewing machine and the reaper and mower. It does not know of the army of inventors, most of them obscure, who have toiled so assiduously and effectively that while a hundred years ago it might be said that everything a man used was hand-made, now there is hardly an article used by him which is not in part machine-made. The more the machine displaces the man the faster the price comes down.

The Invention of Tools.

Men in some countries and in some ages have lived in caves. They had stone hatchets and stone hammers, but no other tools. They were afraid of the tawny lion. They were overtaken by the fleet-footed wolf. They were powerless in the presence of the wild horse. They cowered before the storms of winter, and were in all respects more defenceless, destitute and forlorn than the beasts that roamed the forests about their rocky homes.

Gradually and by slow degrees those men, through the hardships and privations of many generations, have materially changed their condition. They are not afraid of the tawny lion now. The fleet-footed wolf is overtaken by them. The wild horse does their bidding. They laugh at the storms of winter, and are in all respects more powerful and formidable than the beasts that once roamed the forests where now extend broad fertile fields.

What is the cause of this great change? Carlyle has described man as a "tool-using animal." Without tools he is weak, powerless. With tools, he is master of the world.

Take away the sword and the musket and man becomes a weak soldier. Take away the saw, the hammer and the square and housebuilding becomes almost impossible. Take away the plow and the hoe and agriculture would be impracticable. Take away the printing press and ignorance would be universal.

The civilized man is a "tool-using animal," and the man without tools becomes a helpless barbarian.

E. L. ARNOTT.

False Reasoning of the Pessimist.

The Pessimist will tell you that labor-saving machinery is a curse and the cause of hard times, for it has made it possible for one man to do the work that was done by ten men before the present inventive age set in.

The fallacy of his argument lies in the fact that there has been an infinite improvement in the moral, social and physical conditions of the work-people throughout the whole circle of Christendom since the introduction of steam, electricity and the thousand-fold mechanical improvements of the last century than was perceptible prior to that epoch in human history. The peasant of today can com-

mand more comforts than the prince of 1794. He can procure more wholesome food, live in more healthful quarters, travel faster, communicate with distant friends more quickly, has better artificial light, cheaper fuel and easy access to a more comprehensive knowledge of home and foreign affairs than the most powerful king could have commanded one hundred years ago.

The building of railways, operating them when built; the construction of telegraph and telephone lines, operating them when constructed; the manufacture of labor-saving machinery itself, have all tended to create new, wider and better fields for the laboring man and at the same time to supply him with more leisure, better pay and more progressive ideas than he ever enjoyed in the old foggy times that the Pessimist is so prone to extol. He may tell you that the times were never harder than at present. Therein he shows his ignorance of history. Times were always hard with the poor in the old days. No matter how hard they drudged the masses of the old world and the new were unable to command more than a hand-to-mouth living. They were slaves. Men, women and children were all bond-slaves to work. When hunger came, and the hearth was fireless, and their clothes were ragged; in seasons of drought, destructive freshets, plagues, war and other calamities there were no great charitable organizations to help them tide over such hideous periods until work revived and they could return to the old grind, grind, grind of a labor that in the best of times barely kept them out of the poorhouse or out of the more generous grave.

But let the Pessimist weep water and lift his jeremiads forever, it will make no difference in the inevitable outcome of events. Inventors will continue to invent, the world will continue to bless their achievements and the Pessimist will continue to adopt to the new order of things, even while kicking at it with his most vicious and vigorous kick.

WILL HUBBARD KERNAN.

Recent Patent Decisions.

In the case of W. N. Miller et al. vs. The Eagle Manufacturing Co., appealed from the Circuit Court of the Southern District of Iowa, and involving patents on wheel cultivators, the Supreme Court has rendered an important decision, the decision having been written by Justice Jackson. The law is laid down by the learned judge that a man may anticipate himself; or in other words where he has taken out a patent which has run some time, and afterwards seeks another patent, the second application for a patent will be considered in the same manner as if the first patent had been granted to another and entirely different person for the same invention. In this particular case the judge said that the applicant for a patent had also been anticipated by a previous invention. The judgment of the Circuit Court was reversed on these grounds.

Judge Shiras of the Supreme Court has rendered a decision in the case of Henry A. Adams vs. The Keystone Manufacturing Co., brought for infringement of a patent on a corn sheller, sustaining the patent, but reversing the judgment rendered by the Circuit Court of \$27,000 on the ground that the court below had permitted a lot of irrelevant and incompetent testimony to be introduced, and directed in reversing the decision of the lower court that judgment be entered for nominal damages only.

Chief Justice Fuller rendered the decision of the Supreme Court, sustaining the judgment of the Circuit Court for the district of Connecticut in the case wherein John F. Wollensak was plaintiff, for an infringement on an improved transom lifter, deciding that Sargent & Co., of New Haven, Conn., were not infringers, because the patent of Wollensak was void.

The Dentler Cement.

The Dentler Cement is a new hydraulic cement made out of limestone, found everywhere in this country. It is watertight, hardens quickly in the open air, of the same specific gravity and color as Portland cement and can be used for the same purposes as the best Portland cement.

IMPORTANT CONVENTION.

Third Annual Meeting of the American Association of Inventors and Manufacturers.

The third annual meeting of the American Association of Inventors and Manufacturers, which was held in this city January 16th and 17th, was an event of more than ordinary importance. It brought together some of the brightest minds in the inventive world, and was very generally attended by those taking an interest in inventions and matters connected with the United States Patent Office. This Association was organized in 1891, during the celebration of the Patent Centennial, and each year has added to its membership, and each annual meeting has evidenced increased interest in the worthy objects and aims of the organization, which are "to promote the progress of science and useful arts;" the diffusion of practical, scientific and legal information respecting inventions; the encouragement of favorable and discouragement of unfavorable laws respecting property in patents; the co-operation of foreign inventors for reciprocal regulations under foreign patent systems, and the proper, just and adequate protection of the rights of American inventors authorized by the Constitution of the United States.

The business sessions were held in the rooms of the Board of Trade, and a public meeting was held



DR. R. J. GATLING.

on the evening of the 16th in the Builders' Exchange Hall at which the formal papers were read and discussed. Among the members in attendance were Dr. R. J. Gatling, Hartford; J. C. Anderson, Prof. J. E. Watkins, L. L. Bond, Chicago; L. W. Serrell, Thomas Ewing, Jr., Walter S. Logan, Richard H. Gatling, Robert P. Porter, New York City; Thos. N. Ely, G. S. Clark, Philadelphia; John V. Rice, Oberlin Smith, Bridgeton, N. J.; Arthur Steuart, Baltimore; Prof. Cyrus F. Brackett, Princeton, N. J.; F. E. Sickels, Kansas City, Mo.; Gardiner G. Hubbard, Wm. C. Dodge, J. L. Atkins, Marvin C. Stone, Geo. C. Maynard, Emile Berliner, W. F. Roberts, A. W. Van Dorsten, W. E. Woodbridge, R. G. DuBois, J. R. Dowell, Marshall H. Jewell, Alex. S. Capehart, F. A. Seely, B. H. Warner, of this city, and others from various parts of the country.

Secretary Anderson, on behalf of the Board of Trade, tendered the Association a cordial welcome to the city and the free use of all the facilities of the Board for the transaction of its business.

In the business session Mr. Gardiner G. Hubbard, Chairman of the Committee on the World's Columbian Exposition, made a report of the work of his Committee and the very successful results attained, and Arthur Steuart, who was the Association's special representative at the Congress of Patents and Trade-Marks at Chicago, presented an exceedingly well written and interesting report of the proceedings on that occasion.

The Committee on Legislation, of which W. C. Dodge, of Washington, is Chairman, submitted a report showing what bills relating to patents are pending in Congress, and explained the action of the Committee in regard to them. During the present session of Congress fourteen patent bills have

been introduced, two of them of the most radical character. One of these proposes to change the life-time of a patent from seventeen to seven years, and the other provides that the government shall have the right to cancel any patent upon payment to the inventor or owner of not less than \$25,000 nor more than \$100,000. The Association opposes these bills and their passage is not probable. As a general thing the Association approves measures recommended by the Commissioner of Patents and co-operates with him, but in some instances there has been strong opposition to amendments originating in the Patent Office. Last year Commissioner Simonds made a strong effort to secure the enactment of a law requiring applicants to pay an extra fee of \$10 on every appeal from an examiner to the Commissioner. The Association did not deem this a just tax on inventors and used every fair means to prevent the passage of the amendment.

The pending House bill, No. 5014, contains some amendments to the Patent Law prepared by the Association after conference with the Chicago Patent Bar Association and other interested parties throughout the country and its passage is urged by the Association.

Mr. Dodge's committee is to have a hearing before the House Committee on Patents to explain the amendments and the reason for their adoption. The important sections of the bill are the following:

"No person shall be debarred from receiving a patent for his invention or discovery, nor shall any patent be declared invalid by reason of its having been patented, or cause to be patented in a foreign country less than two years prior to the application for a patent on the same invention in this country; but every such patent hereafter granted shall be limited in duration to the term of seventeen years from the time when the earliest foreign patent commences to run."

"That section forty-nine hundred and twenty-one of the Revised Statutes be, and the same is hereby, amended by adding thereto the following clauses: But hereafter, whenever a patent is alleged to be infringed, the patentee or his representatives shall seek his remedy by bringing suit in the first instance against the manufacturer or vender of the article alleged to infringe said patent, and shall in no case bring suit against any individual who shall have purchased, in good faith, an article of a regular dealer in the open market for his own use until the patent has been sustained by a decree of the court where such suit is brought: *Provided*, That such individual purchaser shall give to said patentee or his representative, at his request, the name and residence of the party from whom said article was purchased; and where the damage so claimed is less than fifty dollars the plaintiff shall pay the costs of suit of both the defendant and plaintiff; and provided also, that this exemption from liability of the individual purchaser shall not apply to any corporation, firm or company, nor to any corporation or party as to any patented machine or process made or used by them for the manufacture of an article or product for sale. Actions at law or suits in equity for infringements of patent rights may be brought in the district where the infringement occurs, whether the defendant or defendants be domiciled therein or in some other district; and where an infringement is begun in one district and completed in another, or is partly in one district and partly in another, the plaintiff or complainant may bring his action or suit in either district at his option."

The Association adopted a resolution offered by Mr. Berliner directing that measures be taken to secure the active co-operation of scientific and technical societies throughout the United States.

On motion of Mr. Serrell the following resolution was adopted:

Resolved, That the thanks of this Association are due and tendered to the Committee of the World's Congress on Patent and Trade-Mark Congress for their co-operation in advancing the interests of the patent system, and for their interest in the rights of inventors and manufacturers in patents and trade-marks.

A letter from Ephraim Banning asking the aid of the Association in securing subscribers to the reports of the Patent and Trade-Mark Congress was read and the members of the Association were strongly advised to secure copies of the book.

The following letter from A. S. Hallidie, of San Francisco, an eminent engineer and the original inventor of the cable railway system, was presented to the meeting:

"It would be of great advantage to inventors and patentees, and to those interested, if a branch of

the Patent Office could be established in this city, in which all the reports and literature could be deposited, and where a government officer could receive, receipt for and forward applications for patents and deliver patents and documents from the Patent Office, Washington.

"The Association will recognize the fact that we are about 3,300 miles from Washington, and that patentees, inventors and others interested are entitled to as much consideration as is shown by the Mint, Treasury, Post Office, Pension Office, etc., of which branches exist in this city, and that a competent man in such an office here would also tend to facilitate the efforts of inventors and would enlarge the usefulness of the Patent Office on the Pacific coast."

The question of the publication of a monthly periodical as the official organ of the Association was introduced, and, after full discussion, was laid over until the next annual meeting. It was the unanimous sense of the meeting that the active interest in the purposes of the Association manifested by publishers of the daily papers and technical journals, and the wide circulation given to the proceedings by them, keeps the organization closely in touch with the public and renders the publication of an official organ unnecessary at present.

The Executive Council was instructed to prepare for publication the proceedings of this meeting and the papers which have been received in book form for the use of members and others.

PRESIDENT GATLING'S ADDRESS.

On the evening of the 16th President Gatling read the following carefully prepared address showing the progress of the Association during the past year, and containing much information of great value to all persons interested in inventions and to the general public:

GENTLEMEN OF THE ASSOCIATION: History furnishes no example of any nation that has increased in population and material wealth, or achieved so much in the arts and sciences within so brief a period of national life, as has the United States. Some of the causes of this astonishing progress are as follows:

First. The energy and inventive genius of the people inspired by our patent laws, which have lead to thousands of inventions embodied in machinery, driven by steam, water and electric power, that do the work of willing and delicate hands, and which have contributed so largely to the comfort, happiness and welfare of the people.

Second. The superabundance of natural resources, such as fertile soil, mineral wealth, rivers, lakes and harbors with outlets to two oceans.

Third. The union of the states cemented in love and mutual interest by a written constitution formed by our wise forefathers which defines and limits the power of the national and state governments, and guarantees to the people the right and benefit of self government. Under these inspiring and benign influences this country has prospered and increased in wealth, power and national prestige relatively far beyond any other nation, as is evidenced by the following statistics:

In 1880, the aggregate wealth was \$43,642,000,000, while the interest bearing public debt of the United States amounted to \$1,723,993,100, and the annual interest charge to \$79,633,981, while in 1890 it amounted to but \$725,313,110 and the interest charges to but \$29,417,603—being a reduction of the total debt of almost \$1,000,000,000 in ten years, or an average liquidation of the debt of 100,000,000 a year. In 1880 there were 629 saving banks holding total deposits amounting to \$891,961,142, while in 1890 the number of these banks had increased to 1,011, and the amount of deposits to \$1,654,826,142. In 1880 the capital invested in manufacturing amounted to \$1,232,839,670, and ten years later to \$2,900,735,844, the value of their products increasing during this period from \$2,711,579,999 to \$4,860,286,837, while the wages to employes increased from \$501,965,778 to \$1,221,170,454, or more than two fold. The average value of the yield of farm products also increased from about \$3,475,000,000 in 1880 to \$4,500,000,000 in 1890. In 1880 the product of pig-iron in the United States aggregated 3,835,191 tons annually, while in 1890 this aggregate had increased to 9,202,703 tons, or in other words the production had almost trebled.

In 1880 the total mileage of railways in the United States was 92,269 miles, while in 1890 it had increased to 166,702 miles, while the number of locomotives in service increased from 20,116 to 31,812. The num-

ber of passenger cars from 14,548 to 21,664, and the number of freight and baggage cars from 653,275 to 1,069,205. In 1880 there were 233,534 miles of telegraph wire or lines extending over the country, while in 1890 the distance covered had been increased to 678,999 miles, and the money received for messages sent over these lines increased from \$12,782,895 in the former year to \$22,387,029 in the latter.

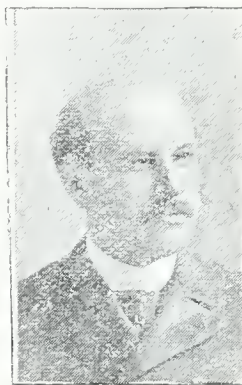
The above statistics I used in a paper I read before the World's Patent and Trade-Mark Congress which convened in Chicago in October last. I quote them to show the marvelous increase of wealth and business that have taken place within a decade. There are no data to show how much of this immense increase of wealth and business is due to patented inventions; but it is reasonable to suppose that at least one half has been produced by new inventions. At least such inventions have been the main spring of progress. The discovery of the gold and silver mines of California, and in the new states and territories, it is true has contributed to the nation's wealth and business. Another means of producing the result mentioned grows out of the fact that the people have learned to produce most of the goods and necessities of life used in this country, which renders them independent of foreign nations. Inventions have been the means of lowering the price of all kinds of manufactured products. In 1833 imported wire nails cost the American consumer \$10 a keg. Today he buys a better quality of wire nails of domestic make for \$1.90 a keg. In 1833 Americans paid \$68 per ton for English wire rods. Today domestic wire rods of superior quality cost \$30 per ton. Ten years ago the American farmer paid ten cents a pound for barb wire for fences; now he gets the same for 2½ cents per pound.

Who can estimate the wealth and changes that have been produced and the comforts that have been brought to the people by the invention of the steam engine, the spinning "Jenny," the power-loom, cotton-gin, locomotives and railways, the steamship, the sewing machine, the modern plow, mowing-machine, the harvester and automatic binder, the threshing machine, vulcanized rubber, the perfected printing press, the telegraph, the telephone, the electric light, water wheel, pumps, lamps, compass, tanning, gun powder, fire arms, paper, power knitting machinery, grist, planing and saw mills, clocks and watches, telescopes, artificial heating apparatus, musical instruments, and hundreds of other inventions which have contributed so largely to the prosperity and welfare of mankind. Seventy years ago there was not a steam railway in the world. The first railway constructed in the United States, in 1820, had longitudinal rails made of wood upon which were spiked flat bars of iron not unlike that used on wagon tires. These strips of iron often became detached from the wooden rails and formed what were called "snake heads," which not infrequently passed upwards through the bottom of the car and killed passengers in their seats. It is needless to point out the many and vast improvements in railways and railway appliances that have been made and patented since the above period. The first locomotive used had low wheels and weighed only a few tons, and could only draw one or two light passenger cars, and was a mere toy as compared to those now in use. Not only have locomotives and passenger cars been improved by the genius of man, but the means of making railways and railway rails have been immensely improved and cheapened by new inventions. Years ago railway rails were made of iron formed between rolls, and giant men were employed with tongs to insert the iron between the rolls and pull it from the same; but now this is all changed, for automatic machinery has been devised to handle and manipulate the steel ingots, and rails can be made almost as fast as one can count. These improvements have been so great as to enable the production of steel rails of the very best quality to be bought at the price of \$30 or less a ton; while the rails formerly made by the old method cost from \$100 to \$150 per ton.

Not only has invention contributed to the improvement in railways, but to everything else, and is the salvation of all industries. By the aid of inventions such as mowers, reapers, threshers, etc., farmers are enabled to increase their products with far less labor than at any other period. Manufacturers of all kinds are enabled, by the use of modern inventions, to save manual labor and increase and cheapen their products. It is estimated by men best informed on the subject that eight thirteenths of the world's wealth is produced by brains—that is, by new inventions and the skill and foresight involved in general management, while manual labor produces only about five thirteenths. Thus is seen the wonderful result that follows from invention. Some are so foolish as to believe that labor saving machinery results in injury to the masses of the laboring people; such persons are short-sighted and fail to take a comprehensive view of the subject. It takes an area of one square mile to support one savage who has no tools or machinery to aid him in his labor; if two savages were to attempt to occupy the one mile of territory (neither having any tools or machinery), one would have to starve or be forced from necessity to kill the other.

With the abundance of tools and machinery now in general use, it is possible for two or three hundred persons to live on a square mile comfortably. Surely all who wish the human race to prosper should be in favor of the greatest possible increase of inventions which have done and still are doing so much for the good of the human race. The wisest of men have learned to appreciate inventions. Lord Bacon says: "The introduction of new inventions seemeth to be the very chief of all human actions." William H. Seward said: "The exercise of the inventive faculty is the nearest akin to that of the Creator of any faculty possessed by the human mind." Senator John W. Daniel, of Virginia, has said: "The world has grown wise enough to know that with every new invention that saves labor, luxury is laid at the feet of the toiler, and skillful hands and brains are relieved from menial tasks for others more exalted."

Inventions have promoted and increased all kinds of business, not only in manufacturing industries and in mining resources, but in farming, transportation, etc., etc. The cotton-gin has made the South the greatest cotton producing country in the world. The invention of reapers, mowers and threshing-machines have immensely increased farm products, and have made the United States the greatest grain-growing country on this planet. The invention of the steam engine and railway have opened up abundant and cheap transportation in all parts of this country. A man can now cross this continent by rail as easily and quickly as he could have formerly traveled a few hundred miles by the old stage coach; and by fast ocean steamers, propelled by triple compound engines, the ocean is made a ferry, as it were, to cross. The steamboat tonnage on our numerous rivers and great lakes exceeds that possessed by most nations. No laws ever passed by Congress have done, perhaps, so much to promote and develop industrial progress as our patent laws. More patents are taken out annually in the United States than in all other countries combined. Our patent system has not only proved a blessing to the people, but is something that the nation should take pride in. No other building of its kind equals the Patent Office, which was erected expressly for patent business, and it should be preserved and used for no other purpose than that for which it was designed. Our patent laws need amending in certain respects, and it is to be hoped that Congress will, at its present session, pass some acts that will improve our patent system, and that will give relief to the present crowded condition of the Patent Office. The health of some six hundred highly intelligent men and women, who make up its working force, is now endangered by being crowded in the badly ventilated rooms in the basement of the building. Is it not a shame that such a state of affairs should exist?



B. H. WARNER.

It gives me pleasure to be able to state that the membership of the American Association of Inventors and Manufacturers has increased during the past year, and it is confidently believed that its labors and influence will result in great good to the country. Great credit is due to the members of the Executive Committee, and to Mr. George C. Maynard, the worthy Secretary of the Association, who have given so much of their time and attention to building up the Association and promoting its worthy objects.

Two very important events have occurred during the past year. One was the World's Columbian Exposition, which may justly be regarded as the most artistic and the grandest display ever seen, of human skill, power, genius and handiwork. The other was the World's Patent and Trade-Mark Congress, which convened in Chicago in October last, and which was attended by inventors and men of science from all parts of the world. During the Congress some forty papers were read treating of inventions, patents, trade-marks, and on various subjects appertaining to the arts and sciences. These addresses are to be printed in book form and will make a valuable volume for future reference.

In retiring from the Presidency of the Association, I wish to return my sincere thanks to its members for the honor they have conferred in electing me for their President for the past three years. I earnestly hope the Association may continue to prosper, and that its influence may be felt for good for generations to come.

The other papers read before the Association at this meeting, and which will appear in full in this or subsequent issues of the INVENTIVE AGE, were as follows:

"Needed Modifications of Our Patent Laws," by Walter S. Logan.

"The Right of Property in an Idea," by Allen Ripley Foote.

"The Patent Office," by Thomas Ewing, Jr.

"Interference Proceedings in the Patent Office," by L. W. Serrell.

"Proposed Repeal of the Caveat Law," by F. A. Seely.

"Suggestions for Improvements in the Personnel of the Officers of the United States Patent Office," by Arthur Steuart.

"Regarding Interference," by J. C. Dowell.

"Procedure in Patent Cases," by Richard H. Gatling.

"The Material Influence of the Patent System upon the Farmer and his Duty to Uphold It," by Jno. M. Fairfield.

"The Relations of Financial Investments to Patent Rights," by B. H. Warner.

"A Suggested Reform in Patent Practice Concerning the Question of 'Invention,'" by Chas. M. Higgins.

Reports of the Secretary and Treasury showed a decided increase in the membership of the Association and a very favorable condition of its financial affairs. Secretary Maynard has directed the affairs of his office with marked ability, and the members of the Association expressed unqualified approval.

Some of the prominent men who have recently joined the Association are: Ex-Secretary of the Interior, John W. Noble; Judge L. L. Bond, of Chicago; Ephriam Banning, Chairman of the World's Columbian Congresses; Lewis Miller, a large manufacturer in Ohio and the father-in-law of Edison; Nikola Tesla, the electrical inventor; C. W. Seamans, President of the Remington Typewriter Co.; Col. F. A. Seely and Judge Walter Johnson of the Patent Office, and Sylvanus D. Locke, manufacturer of harvesters, Hoosick Falls N. Y.

NEW OFFICERS.

President, R. J. Gatling, Hartford, Conn.; First Vice-President, Gardiner G. Hubbard, Washington, D. C.; Second Vice-President, Geo. Harding, Philadelphia, Pa.; Third Vice-President, J. C. Anderson, Chicago, Ill.; Fourth Vice-President, B. H. Warner, Washington, D. C.; Secretary and Treasurer, Geo. C. Maynard, Washington, D. C.

Directors: F. A. Seely, Washington, D. C.; F. A. Pratt, Hartford, Conn.; R. S. Munger, Birmingham, Ala.; Marvin C. Stone, Washington, D. C.; Arthur Steuart, Baltimore, Md.; Albert A. Pope, Boston, Mass.; L. W. Serrell, New York City; John V. Rice, Jr., Edgewater Park, N. J.; W. W. Willits, Chicago.

Of the directors only Messrs. Seely, Pratt and Munger were elected at this meeting, the term of the other members not having expired.

NEW MEMBERS.

The following are some of the recent accessions to the Association:

Eugene L. Arnott, Patent Solicitor, Greenfield, Highland Co., Ohio.

Joseph L. Atkins, Patent Lawyer, 930 F Street, Washington, D. C.

Wm. C. Baker, Car Heating, 143 Liberty Street, New York City.

Wm. J. Bamfield, General Manager Pennsylvania Telephone Co., Harrisburg, Pa.

Ephriam Banning, Attorney and Counselor-at-Law, 225 Dearborn Street, Chicago, Ill.

Henry Bentley, Electrical Engineer, cor. Walnut and Morton Streets, Germantown, Philadelphia, Pa.

L. L. Bond, Attorney and Counselor-at-Law, 1147 Monadnock Building, Chicago, Ill.

Jas. A. Bonsack, 1326 Chestnut Street, Philadelphia, Pa.

Alex. S. Capehart, Editor "Inventive Age," Washington, D. C.

F. J. Clamer, Metallurgist, 46 to 52 Richmond Street, Philadelphia, Pa.

G. S. Clark, Superintendent Fidelity Insurance Trust and Safe Deposit Co., 325, 331 Chestnut Street, Philadelphia, Pa.

Asa S. Cook, Manufacturer, Hartford, Conn.

John F. Corker, Patent Attorney, 251 South Main Street, Salt Lake City, Utah.

J. C. Cushman, Secretary Anderson Brick Co., 1015 The Rookery, Chicago, Ill.

F. Ecaubert, Machinist, 60 Rose Street, New York City.

George F. Eisenhardt, Mechanical Engineer, 1306 Howard Street, Philadelphia, Pa.

A. French, A. French Spring Co., Pittsburg, Pa.

Richard Henry Gatling, Counselor-at-Law, 229 Broadway, New York City.

B. B. Hill, Manufacturer, 1020 New Market Street, Philadelphia, Pa.

Herman Hollerith, Tabulatory Machines, 501 F Street, Washington, D. C.

Marshall H. Jewell, Editor "Inventive Age," Washington, D. C.

Fred B. Jones, Manufacturer Railway Supplies, 110 Ontario Street, Chicago, Ill.

Walter Johnson, Examiner of Interferences, U. S. Patent Office, 918 M Street, N. W., Washington, D. C.

John F. Kingsley, Mechanic and Inventor, Athens, Pa.

Jno. Kirley, Jr., General Manager The Dayton Manufacturing Co., Dayton, Ohio.

Geo. M. Lane, Electrical Engineer, Asbury Park, N. J.

Sylvanus D. Locke, Manufacturer Automatic Binding Harvesters, Hoosick Falls, N. Y.

Thos. D. Lockwood, Advisory Electrician American Bell Telephone Co., 125 Milk Street, Boston, Mass.

Wm. McClave, Manufacturer of Grates and Blowers for Boiler Furnaces, 301 Seventh Street, Scranton, Pa.

Lewis Miller, Manufacturer, Akron, Ohio.

D. K. Miller, Mechanical Engineer, 420 Library Street, Philadelphia, Pa.

John W. Noble, Ex-Secretary of the Interior, Rialto Building, St. Louis, Mo.

Alonzo W. Paige, Paige Iron Works, 26 Ontario Street, Chicago.

Frederick J. Patterson, General Manager American Promotion Co., 449 The Rookery, Chicago, Ill.

Robert P. Porter, care N. Y. Daily Press, New York City.

C. W. Raymond, Manufacturer Clay Working Machinery, Dayton, Ohio.

C. W. Seamans, President Union Typewriter Co., 1267 Pacific Street, Brooklyn, N. Y.

Col. F. A. Seely, Examiner U. S. Patent Office, Washington, D. C.

William John Smith, Mechanical Engineer, cor. Sixth and Arch Streets, Philadelphia, Pa.

B. H. Warner, President Washington Loan and Trust Co., and President Board of Trade, Washington, D. C.

EVOLUTION OF THE RAILWAY.

Something About the Wonderful Exhibit Made by the Baltimore & Ohio at the World's Fair.

The average visitor to the World's Fair as he passed through the golden doorway of the great Transportation Building was amazed at the bewildering display offered to his eyes of the latest achievements in the line of railways and steamships, but it remained for a great railroad corporation, whose lines span half the continent, to present a display so unique, so exhaustive in its comprehensiveness, so interesting and instructive that one wondered that any single organization would take so much pains to collate such a mass of historical pictures and object lessons. Never was there a collection so full of general interest.

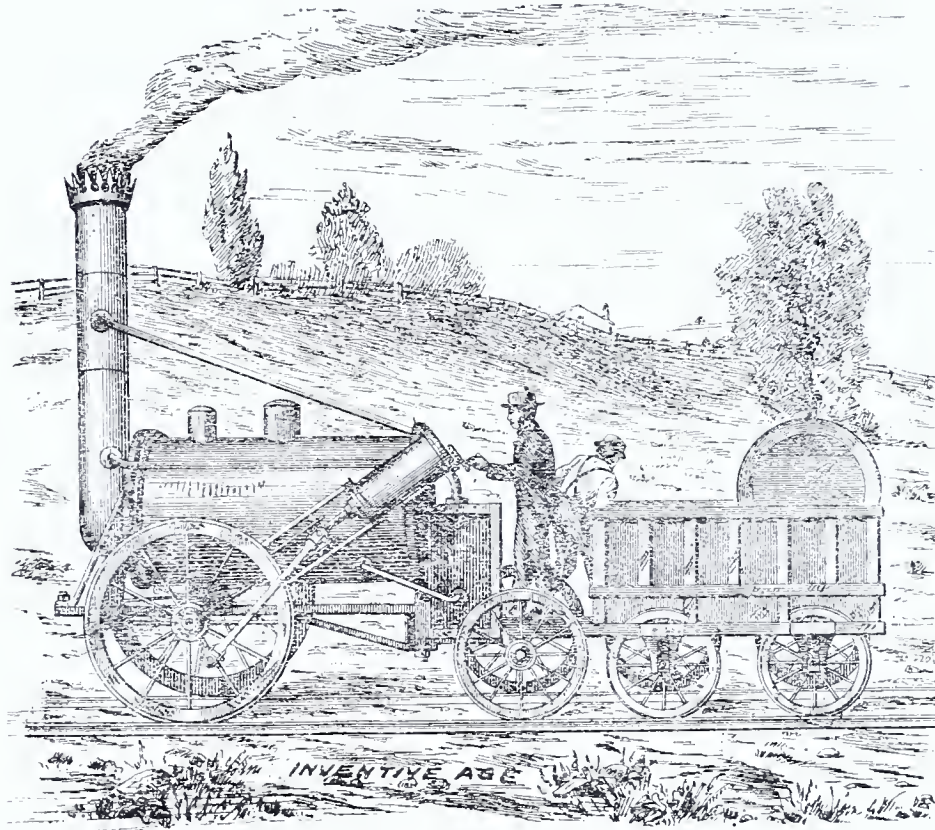
The steam locomotive is not of such rare antiquity that its origin and growth cannot be traced. Men who are alive today have seen the first locomotive engine making its experimental journey and remember the doubtful shakes of the head that greeted its introduction as a factor of commerce, and although knowing that it was a practical albeit a difficult undertaking to bring together in one collection the exhibit of the steps that led up to the com-

old-fashioned iron kettle turned bottom up on a cart than an engine of the present day. There was a steam wagon of 1769-71, a three-wheeled engine of 1784, and a flat car built according to an idea of propulsion on land by steam in 1790. The "Trevithick," an idea of 1800, was put into a working model and showed what the engine would have looked like, and there was also a full working model of the "Trevithick" of 1803-4, which was a part of the first railroad train in the world. There was a practical and serviceable engine of 1812 known as the "Blankensop," and the "Brunton" of 1813. Next was the Heady model of 1812, constructed to demonstrate the fact that a smooth wheel could be operated on a smooth track, built to be operated by a crank, but sufficient to demonstrate the principle when the "Puffing Bill" of 1813 was built; the "Blucher," the first designed and built by George Stephenson; also Stephenson models of 1828 and 1829 and of the "Howard" of 1829, the first patented engine. "The Rocket" and the "Sans Parcel" of 1829 by Stephenson were also shown, but of greatest interest was "The Strowbridge Lion," by Stephenson in 1829, being the first locomotive ever seen in America. The "Tom Thumb" of 1829-30, carrying water in a barrel and wood in a box, said to be the first to draw an engine on the American continent

making thirteen miles in 1 hour and 12 minutes, August 28, 1830, between Baltimore and Ellicott City. There were also models of the "Mercury," "The Best Friend," "The George W. Johnson," the "York," the "Costelli," the "Child," the "James," and the remodeled "York" of 1830-31. The latter actually drew fourteen tons five miles in one hour together with four cars. Then there was the "Atlantic," of 1832, the first known "grasshopper," which had seen sixty years' service, the "Old Ironsides," and the "South Carolina" of the same year, various other engines of 1832, and other dates in the thirties and forties, including the "Lafayette," the "Hercules," the "Sandusky," the "Rocket," the "Sampson," the "Campbell," the "Albion," the "Jefferson," the "Trader," the "Buffalo," the "James," the

"Experiment," the "Mount Clare," which was the first designed and built for the B. & O. The "Sampson," built in 1838, was in use for forty-five years. The "Camel" of 1837 was shown as the first type of the American standard engine. The "Trader" of 1823 was used sixty years as a switching engine. The Mason of 1853 was the first example of the Mason and the nearest approach to the modern engine. The "Pepper Sauce" was the first mountain-climbing engine in the world and was built in 1863, and the same year the "Perkins," which was the first heavy ten-wheel engine. In 1876 the "600," being the first mogul, was shown at the centennial by the B. & O., and at the recent Columbian Exposition was shown the "Director General," a great triumph in the art of railroad engineering.

All of the engines mentioned were either shown in their own proper character or in full-sized working models, even the ideas of the early inventors having been given expression. They were arranged so as to show the evolution of railroading in every feature in its strongest and best light, and teach lessons well worth studying or contemplating by anyone of a thoughtful or mechanical turn of mind. It was fitting that the Baltimore & Ohio, the first in railroad construction in America, should be permitted to so fully illustrate the birth, growth and mature life of "The World's Railway" at the world's greatest Exposition.



AN OLD TIME LOCOMOTIVE.

plete engine of the present, the Baltimore and Ohio Railroad Company conceived the idea of reproducing the various types of the forerunners of the modern iron-horse. Undeterred by failure or the prospect of enormous expense they pressed steadily on, enlarging the scope of their exhibit so as to include the development of steam carriages of all kinds in all countries, thus entailing researches of the most exhaustive character. In many instances the original locomotives were obtained, and when not obtainable wooden models, exact reproductions, were built and hundreds of accurately executed sketches of the first crude attempts were made and placed in chronological order along the walls of the space allotted to the company. Quaint and curious devices were the outcome of these early inventions and their appearance on the streets today would excite laughter and ridicule; but they show how the mind of man was working out the important problem of steam road navigation.

In all its details the exhibit of the panorama of railroading was a most unique affair and one of the most instructive on the grounds. There was exhibited a section of the military road built by Caesar shown in connection with the perfect railroad tracks of today, by means of which thousands of troops could quickly be moved from one part of the country to another. Isaac Newton's first idea of the steam engine was produced in working models. It dates back to 1680, and the result is more like an

THE COLUMBIAN EXPOSITION.

Reports of President Palmer and Executive Committee on Awards—Medal and Diploma.

Several persons insist on having first proposed that the American people fittingly commemorate the four hundredth anniversary of the discovery of this continent by Christopher Columbus, but, as there is no tribunal vested with authority to adjudicate the claims of these individuals, originality of conception, as applied to the great Columbian Exposition, which was the outgrowth of this first thought, may never be bestowed upon any particular individual. The great exhibition was held, and its grandeur, its glories, its instructive features, and its impress will live on forever as a fitting memento to the enterprise, stability and patriotism of nineteenth century Americanism in general, and in particular to those individuals who so successfully carried it to a perfect completion in every detail. The Fair itself now belongs to history, and it only remains for those in authority to correctly record its wonderful achievements and valuable teachings.

Very soon after the gates of the Fair closed the Administration building was deserted and the different departments of administration took up their headquarters in the city of Chicago, except the Bureau of Awards. To facilitate the issuance of the medals and diplomas, which is a feature of the exhibition placed under direct charge of the Secretary of the Treasury, the Bureau of Awards, with its important records, was transferred to this city, and is now located in the Pacific building, on F between 6th and 7th streets. This bureau is now in a most complete and thoroughly organized condition. Being segregated as it is, and as it was not at the Fair, from daily visits of thousands of persons interested in awards, the attaches accomplish actual results and are not compelled to give up valuable time to answering inquiries. The work of detail is progressing rapidly and satisfactorily, and from present indications it will not be many months until prize-winners will have received their medals and diplomas, and this department of the great exhibition passed out of existence. As much cannot be said for either the Centennial or Paris exhibitions. It is said the latter is still bestowing awards on exhibitors.

It has begun to dawn upon a very large number of persons who secured awards at the World's Fair that the acts of Congress and the World's Columbian Commission, carrying out the provisions of these acts, provided for and formulated a plan under which awards were to be given. The principal feature of this plan was that this exhibition should determine and establish what progress had been made in the development of the resources of the world and what advancement was shown along the lines of the civilization of humanity and the education of mankind. At all previous international exhibitions, except partially so at the Centennial (and carrying out the old European idea), prize-winners were given medals in competition, the composition of which medals determined the grade of the award, irrespective of what might be said upon the diploma.

The medals bestowed by the World's Columbian Commission are all made of bronze, of one design, except as to special engraving of the name of the recipient and the article upon which the award is given. The language of the diploma is that which is of value, and none of the awards were granted from a competitive standpoint. The points of excellence in each case are specifically named by the individual examining judge, confirmed by an international jury, and the judge's opinion will appear upon the diploma over his signature. Had exhibitors thoroughly understood the conditions brought about by the provisions of the acts of Congress and the rules laid down by the Columbian Commission, acting under the laws of Congress, a somewhat different feeling would no doubt have prevailed during the Fair, especially among foreign exhibitors, when the awards were being bestowed. It was probably not until the middle of August,

when Hon. John Boyd Thacher, chairman of the executive committee on awards, addressed the Association of American Exhibitors, and explained to the association the methods to be pursued in giving awards, that the system was at all generally understood by exhibitors. Not all the exhibitors were present to hear this address, and although the address was printed in pamphlet form for distribution, it is quite likely not all of them read it, and as a consequence it was not until about the close of the Fair, if not later in many instances, that the plan of making awards was well understood or its valuable features appreciated by exhibitors generally.

Under the system adopted and carried out one medal is all an exhibitor can receive, but if his exhibits consists of different articles, classified in separate groups, he will be entitled to and will receive a diploma in each group, if so awarded by the judge. There was no competition in any sense. The judges in arriving at their conclusions established a standard of excellence, and, with this standard in view, named the points of excellence, novelty or merit in each case, and thus gave their reasons why an award was recommended.

As time grows apace these awards will become the more valuable and consequently be the more highly appreciated. They will determine what has never hitherto been attempted to establish at the date of an international exhibition, and that is what was known to exist in the various arts, sciences and industries when the exhibition was held. Just how valuable such information would now be had all manufactured articles, machinery, etc., shown at past exhibitions been fully described as to points of excellence and novelty, can only be appreciated by persons who have been compelled to undergo tedious, embarrassing and expensive investigation and research in attempting to establish their just rights of ownership to certain discoveries and inventions. The system under which the awards were made at the Fair is really only beginning to be appreciated. For all time to come the world can turn to the records of the Columbian Exposition and the diplomas issued to those receiving awards and learn to an absolute certainty just what was known to exist at that time which was of interest to humanity and was considered to be novel or new; and in the cases of intricate and complicated machinery, for the manufacture of almost every conceivable article of value; means of transportation of every kind and character; methods, machinery, etc., for the transmission and control of electricity; machinery and appliances for handling the crops of the land and gathering the products of the earth and sea, and find inscribed thereon, if every other trace had been wiped out of existence, sufficient data to rehabilitate conditions as they existed at the close of the nineteenth century. As much cannot be said for any previous international event in the history of mankind, and it is to the credit of America and Americans that this system was adopted and carried to completion, although the foreigners fought desperately to inaugurate the old European idea of bestowing graded medals and thus leave the world in utter darkness as to what was exhibited, except what individuals may have remembered seeing, with this source of information to go out of existence with time and memory.

In this connection it is but a truth to state that there is probably no individual American who has been so severely criticized during the past six months as has Hon. John Boyd Thacher, chairman of the executive committee on awards. It is but fair to this gentleman to say that in almost every instance these criticisms have been unjust and unreasonable, for the reason that Mr. Thacher, and every member of the executive committee on awards, was simply acting in an executive capacity—carrying out the instructions and rules laid down by the World's Columbian Commission, acting under authority of and in keeping with the acts of Congress creating and empowering it. During the Fair the chairman of the executive committee on awards gave utterance to no reply to the onslaughts of the

press and foreign exhibitors, but recently Mr. Thacher had this to say:

"When the public press were accusing me of suddenly appearing in Chicago with the system of awards I did not think it necessary to publicly announce that I had for two years and a half given unremitting study to this subject. When charged with forcing upon the exhibitors the so-called 'Thacher system' of awards, I did not think it necessary to state that the World's Columbian Commission, which was charged by Congress with the duty of making awards, had formally, after most mature deliberation, unanimously adopted this very system on the 24th day of November, 1890, and that therefore I was simply exercising not a legislative, but a purely executive function. When charged in the public press with the want of courtesy to the foreign commissioners by not adopting, at their demand, the European or continental system of awards, I did not think it necessary, any more than by formal communication to them, to explain that the Congress of the United States, at whose invitation these foreign representatives were with us, and the World's Columbian Commission, the agent of Congress, had already determined the system of awards.

"When charged with giving medals to streets and boulevards, I did not think it necessary to say in a general way that I did not have it in my power to give a medal to any boulevard or to any person who might walk thereon. The power to grant medals is lodged not in the committee on awards but in a board of international judges, and I supposed the public was familiar with that fact; nor did I think it necessary to say that no street or boulevard ever was granted a medal. When charged with giving 80,000 medals when the act of Congress confined us to 50,000 medals as a maximum amount, I did not think it necessary to say that the medals granted were very far less in proportion to the number of exhibitors than were ever granted at any World's Fair, and were less than half the number we were authorized to grant. When charged with consuming all our funds and making a deficit of \$200,000, I did not think it was necessary to declare that this was false, and that we had a balance of \$100,000, more than ample for all our requirements.

"I am a believer in results, and when the world is put in possession of what we have accomplished through our department and through the intelligent assistance of 850 judges in marking with absolute correctness the exact progress made in the arts, industries, and sciences at the end of the nineteenth century, I am confident there will be written opposite the work accomplished by the committee on awards, 'All very well.' "

REPORT OF EXECUTIVE COMMITTEE.

On December 13th the executive committee on awards, which committee is composed of Hon. A. T. Britton, District of Columbia; Hon. W. J. Sewell, New Jersey; Hon. A. B. Andrews, North Carolina; Hon. B. B. Smalley, Vermont, and Hon. John Boyd Thacher, chairman, New York, made its report to Hon. T. W. Palmer, president of the World's Columbian Commission, which is included in the following report of President Palmer to President Cleveland:

TO THE PRESIDENT:—On behalf of the World's Columbian Commission I have the honor to submit the following report.

The World's Columbian Exposition was duly opened to visitors with appropriate ceremonies on the 1st day of May, 1893, and in conformity with the determination of the Commission the same was closed on the 30th day of October, 1893.

Section 13 of the Act of Congress approved April 25th, 1890, creating the World's Columbian Commission, requires that body to make a final report to the President of the United States in which shall be presented a full exhibit of the results of the World's Columbian Exposition.

The object and purpose of this provision in said Act was to place in possession of the Government a comprehensive statement of the arts, industries, manufactures, and products of the soil, mine and sea of the World and especially of the United States as disclosed and demonstrated in said Exposition. It will be observed, therefore, that to comply with this requirement, when it is universally admitted that this Exposition far exceeded in extent and importance any exhibition heretofore held in the history of the world, is a work of great magnitude and can only be accomplished by a vast amount of careful thought and labor. The importance of such a report cannot be overestimated. To publish the present state of the arts, industries, manufactures, and show what are now the products of the soil, mine and sea of the world, and at the same time present the advancement and progress of the civilization of our own country in the past four hundred years, as demonstrated by the industry, genius and patriotism of our people, would indeed be an attainment very much to be desired by the Government of the United States.

After the close of the Exposition the Commission

appointed a special committee consisting of Commissioners St. W. St. Clair of West Virginia, O. V. Tousley of Minnesota, E. L. Roche of South Carolina, Geo. V. Massey of Delaware, Euclid Martin of Nebraska, P. H. Lannon of Utah, the undersigned as chairman, John T. Dickinson of Texas as Secretary, who are charged with the duty of preparing said final report to be presented to the Commission for its authoritative action. In view of the fact that this committee will be required to treat upon every feature of the Exposition covered by its plan and scope, and for that purpose consider the final reports from all the various departments, boards and agencies employed in the inauguration, installation and conduct of the same, including the very important work of the Committee on Awards, several months time will be necessarily occupied in the work. The final reports cannot be made from the Director General and the exhibit departments until the exhibits are delivered back to the exhibitors, which is expected to be accomplished and the report completed by the 1st of April, 1894. However, it is confidently expected that the final report of the Commission will be transmitted to your Excellency not later than November 1st, 1894.

FINANCES.

To enable the World's Columbian Commission and its officers to complete the work required by the Acts of Congress approved April 25th, 1890, and August 5th, 1892 respectively, not including the expense of the Committee on Awards, the following estimate of the actual and necessary expense is submitted:

For the committee of eight directed by the World's Columbian Commission to prepare the final report setting forth the results of the World's Columbian Exposition in compliance with section 13 of Act of Congress creating the Commission, which includes all the expert, stenographic and clerical work, as well as stationery, etc., in the preparation and completion of said final report...	\$15,000
Meetings of the Board of Reference and Control of the World's Columbian Commission, or in lieu thereof.....	2,000
Meetings of the Executive Committee of the World's Columbian Commission.....	6,000
Expenses of the Director-General's office.....	3,000
Expenses of the President's office.....	500
Expenses of the Secretary's office.....	6,000
One session of the Commission necessary for the purpose of confirming and delivering awards to the exhibitors and adopting and transmitting final report to the President of the United States,	10,000
Total.....	\$42,500

The following statement shows the account of the Commission with the Treasury of the United States, January 1st, 1894, other than expenditures for awards:

Appropriation for the fiscal year ending June 30th, 1894.....	\$118,185.00
Deficit for the fiscal year ending June 30, 1893.....	\$11,517.27
Expenditures from July 1, 1893, to December 31st, 1893, inclusive, per voucher register, distributed as follows:	
President's office.....	\$ 2,614.55
Secretary's office.....	5,782.71
Director-General's office.....	10,919.91
Master of Transportation.....	1,473.00
Council of Administration.....	4,549.97
9th Session Commission, from July 1st to Sept. 11, '93, inclusive.....	33,577.49
10th Session Commission, from Oct. 4 to Nov. 6, 1893, inclusive.....	17,609.58
Auditing Committee.....	1,010.55
Ceremonies Committee.....	402.50
Horticultural Committee.....	632.82
Live Stock Committee.....	918.71
Executive Committee.....	3,680.23
Agricultural Committee.....	481.50
Foreign Affairs Committee.....	145.00
Foreign Commissioners Grievance Committee.....	18.30
Medals and Diplomas Committee.....	326.30
Final Report Committee.....	200.75
President's Report Committee.....	85.00
General Expenses Commission.....	2,801.73
Balance unexpended of \$3,000 set aside for the preparation of the illustrations for the final report of the Director-General.....	2,544.15
Unvouchered claims of Commissioners for Subsistence and Transportation, estimated.....	500.00
Estimated unvouchered claims account contingent expenses, for stenographic reports, printing, stationery, telegrams, etc.....	5,000.00
Balance for expenses from Jan. 1, to July 1, 1894.....	\$ 11,382.98

It will be observed that to pay the actual and necessary expenses for completing the work of the Commission the sum of at least twenty-five thousand dollars (\$25,000) will be required in excess of the appropriation for the fiscal year ending June 30th, 1894. This sum can be provided without any additional expense to the government if Congress will authorize the expenditure of that sum out of the appropriation made to the Commission for the fiscal year ending June 30th, 1894, to enable the Commission and the Board of Lady Managers to give effect to and execute the provisions of section six of the Act of Congress approved April 25th, 1890. After paying all the expense of committees, etc., both of Commission and Board of Lady Managers, judges and examiners for the Exposition, and preparing the medals and diplomas to be delivered to exhibi-

tors, there will be a balance in excess of the said deficiency of twenty-five thousand dollars, which can be rightfully expended to pay the same. In equity and fairness this should be done, since a sum much greater than this deficiency has been expended by the Commission from its general appropriation made necessary in the work of granting awards to exhibitors.

EXPENSE OF AWARDS.

The following statements will show the accounts of the Commission and Board of Lady Managers with the Treasury on the 1st day of January, 1894:

Expenditures to January 1, 1894, chargeable against the appropriation made for use of the Committee on Awards of the World's Columbian Commission:

Appropriation (Act of March 3, 1893).....	\$470,880.00
Paid for services as foreign and domestic judges of awards, from March 3, 1893, to Jan. 1, 1894, in the different departments, per voucher register, as follows:	
Agricultural Department.....	\$ 56,478.19
Horticultural Department.....	24,024.30
Live Stock Department.....	5,963.63
Fisheries Department.....	5,062.90
Mines & Mining Department.....	22,360.79
Machinery Department.....	11,972.05
Transportation Department.....	15,373.26
Manufactures Department.....	57,729.50
Electricity Department.....	13,309.99
Fine Art Department.....	29,756.75
Liberal Art Department.....	29,861.10
Ethnology Department.....	2,696.23
Forestry Department.....	5,363.40
Expenditures from March 3, 1893 to Jan. 1, 1894, per voucher register distributed as follows:	\$279,952.09

Committee on Awards.....	9,836.68
Furniture and Fixtures.....	4,585.52
Salaries.....	\$61,538.91
Stationery.....	3,058.28
Postage.....	144.45
Incidentals.....	2,309.46
Judges Badges.....	937.50
Printing.....	1,631.45
General Expenses.....	2,840.79
Electrical Supplies.....	157.04
Vouchers for payment of Judges in process of settlement in the office of the Secretary.....	7,409.89
Vouchers for payment of contingent expenses in process of settlement in the office of the Secretary.....	205.52
Balance.....	\$ 96,273.32

Foreign Judges.....	\$162,000.00
Domestic Judges.....	117,952.09
Expenditures to January 1, 1894, and chargeable against the appropriation made for the use of the Committee on Awards of the Board of Lady Managers:	\$100,000.00

Appropriation (Act of March 3, 1893.)	\$100,000.00
Paid for services of Judges of Awards from March 3, 1893 to Jan. 1, 1894, in the different departments as per vouchers on file in the Treasury Department at Washington, D. C. as follows:	
Agricultural Department.....	\$ 2,921.80
Horticultural Department.....	2,721.50
Manufactures Department.....	26,051.40
Fine Art Department.....	2,750.00
Liberal Art Department.....	15,328.25
Ethnology Department.....	3,314.65
Expenditures from March 3, 1893, to Jan. 1, 1894 as per vouchers on file in the Treasury Department at Washington, D. C., distributed as follows:	\$53,087.60

Committee on Awards.....	1,382.10
Furniture and Fixtures.....	238.20
Salaries.....	\$4,474.79
Stationery.....	21.25
Postage.....	21.00
Printing.....	214.40
Incidentals.....	22.58
Balance.....	\$40,539.08
Foreign Judges.....	\$ 23,970.00
Domestic Judges.....	29,117.60
Expenditures from March 3, 1893, to Jan. 1, 1894 as per vouchers on file in the Treasury Department at Washington, D. C., distributed as follows:	\$ 53,087.60

The forgoing statement of accounts show a large balance on the 1st day of January, 1894 to the credit both of the Commission and Board of Lady Managers on account of appropriations for awards. The work of the Board of Lady Managers in the Department of Awards is practically finished and that of the Commission will be completed in about three months at a minimum cost.

REPORT OF COMMITTEE ON AWARDS.

In order that a more perfect understanding may be had with reference to the system of awards adopted by the Commission, the magnitude, extent and importance of the work of the Committee on Awards and the manner of its execution, the following communication from the Executive Committee of the Committee on Awards is herewith transmitted, which is as follows:

WORLD'S COLUMBIAN COMMISSION,
EXECUTIVE COMMITTEE ON AWARDS,
WASHINGTON, D. C., December 13, 1893.

HON. T. W. PALMER,
President, World's Columbian Commission,
Chicago, Ill.

Dear Sir: The Executive Committee on Awards in response to your request for a report to be submitted, with the report of the Commission to the President of the United States, begs leave to present the following:

The Act of Congress approved April 25, 1890, constituting the World's Columbian Commission, prescribed that the Commission "shall appoint all judges and examiners for the Exposition, award all premiums, if any."

At the third meeting of the Commission a unanimous report was made by a joint committee of the World's Columbian Commission consisting of Commissioners Britton, Smalley, King and Thacher, and a committee of the World's Columbian Exposition consisting of Messrs. J. W. Ellsworth, Benjamin Butterworth, C. H. McCormick and E. T. Jeffery.

Before reaching their conclusions the views of the Director-Generals of the Paris and of the Philadelphia Expositions were carefully examined and official reports were obtained from Hon. R. P. Porter, Superintendent of the Census, Prof. G. Browne Goode, of the Smithsonian, and Prof. Blake, Boston, Mass. They substantially concurred in recommendations which were embodied in the following two important features of the report of the above stated joint committee, viz:

First. "The Committee are unanimous in reporting that awards should not be competitive. This Exposition was designed to show the development of the resources of the United States and the progress of civilization in the New World, in comparison with all nations that might wish to participate. It was thought that it should be put, in its results, upon a higher plane than simply to indicate the relative merits of the competitive exhibits of Smith and Brown. It was believed that it should indicate some independent and essential excellence in the article exhibited, and that it should record some advancement in the state of the art represented by such exhibit."

To that end the Committee recommends that awards shall be granted upon specific points of excellence or advancement, formulated in words by a board of judges or examiners, who shall be competent experts, and the evidence of these awards shall be parchment certificates, accompanied by bronze medals."

Second. "The awards of the board of judges or examiners will thus constitute an enduring and historical record of development and progress as represented by the exhibits in question; the parchment certificates will, by sufficient terms of identification, evidence the award; and the bronze medals will serve to the exhibitor as enduring mementoes of his success. Those exhibits which in the opinion of the judges and examiners do not possess sufficient excellence or intrinsic development to warrant awards will simply be scheduled in the general catalogue of the Exposition."

Third. "It is recommended that there should be but one class or kind of medal and that it should be made of bronze."

At the session of November 24th, 1890, the World's Columbian Commission unanimously adopted the above report.

Congress approved of this plan of awards in the Act of August 3, 1892, and appropriated therefor \$103,000.00 for bronze medals and diplomas of one design, to be furnished under the sole authority of the Secretary of the Treasury. Neither the World's Columbian Commission nor its Committee on Awards had any relationship whatsoever to the preparation of the medals and diplomas. This work was exclusively within the control of the Secretary of the Treasury, and when completed under his supervision the medals and diplomas were directed by the statute to be "delivered to the World's Columbian Commission to be awarded exhibitors in accordance with the provisions of said Act of Congress, approved April 35, 1890."

The action of Congress, of the Commission and of the local directory had thus created the entire scheme of awards and appropriated the money for furnishing the emblems thereof. It will be observed that money awards, or graded awards, or competitive awards were thereby distinctly excluded. A standard of excellence was to be established in each class of exhibits, and the merits of the exhibits were to be measured by that standard and not by competition between each other. The principal object which Congress, through the Commission, intended to effect by this plan, was to make such a history of the meritorious exhibits as would be matter of record for future expositions. That was embodied in the preamble to the original law of April 25, 1890, creating the Commission, wherein the object was stated to be "the exhibition of the resources of the United States of America, their development and the progress of civilization in the New World." To give it both a national and international character all nations were invited to participate. The system of awards was adopted November 24, 1890. The President of the United States issued his invitation, by authority of Congress, to foreign nations on January 14, 1891. The acceptance by foreign nations of this invitation was therefore due to the adoption of the aforesaid system of awards.

Later on the present Committee of Awards and its Executive Committee were constituted under authority of the Commission, for the purpose of carrying into effect the system above prescribed. For a long time they were unable to take any forward steps because of the lack of an appropriation to pay the necessary clerical expenses, compensation to the judges, and the general cost of the machinery necessary to execute the system of awards. It was not until the 3d of March, 1893, that Congress provided the requisite appropriation. Thereupon the Committee was promptly organized and after very careful deliberation the necessary regulations were framed, approved and promulgated. They were published both at home and among foreign nations. Under these regulations the thirteen departments of the fair were each provided with an expert jury, varying in numbers according to the magnitude of the several departments. Those juries were authorized and required to control their own organization, having their respective officers of their own selection, and making the necessary subordinate arrangements to give executive effect to their organization. Out of their number from day to day individual examiners were instructed to investigate and report upon assigned exhibits, such examiner being selected for his supposed qualifications and especial fitness as an expert, in connection with the class of exhibits to be examined, and each being required to submit to this departmental jury a written report, wherein he would state the various features of his examination and the special points of excellence upon which he recommended the allowance of an award in each instance. The departmental jury meeting as a whole, and making further examinations through such committee as they might find it necessary to appoint among themselves, would thereafter carefully examine these written reports, and if dissatisfied with their correctness or sufficiency or otherwise would secure the appointment of other examiners, either one or more, and would have such further report or series of reports submitted to them as they might deem sufficient for their information. When finally satisfied that they had all the facts before them which, in their judgment, were necessary for the making of an award, the jury would set as a whole and determine the question of awards by a majority vote. From that decision there was no appeal upon the merits of the judgment, but if any exhibitor complained that injustice had been done to his exhibit by reason of fraud, or irregularities, or clerical mistakes, it was competent for him to appeal to the Executive Committee on Awards, who were thereupon required to appoint an independent court of appeals to hear and determine the justice of his complaint.

Much time was expended in securing competent judges. Correspondence was had, by way of illustration, with over fourteen hundred societies and technical organizations, with the view of securing their recommendations as to the most qualified experts to be obtained as judges, and for the further purpose of securing their ideas as to the formulated plans for testing the various classes of exhibits. In every way that conservative thought or practical judgment could suggest, whether as derived from the experience of former expositions, or as tested by the probable necessities of present conditions, the Committee sought to obtain, both at home and abroad, the best men in each class of exhibits who were not only upright and competent, but were generally recognized by the world to possess both qualifications. At the request of the Committee the foreign nations submitted lists of judges to be appointed upon their be-

half, and it is proper to remark here that they furnished us with very many gentlemen highly distinguished for their learning and position in their several countries. Many of them have world wide reputations. A similar tribute can be paid to the American judges. Whilst in a general body of judges there might be occasionally appointment of questionable strength it was impossible for an incompetent judge to perform duty for any continuous period without developing that fact. The necessity for his submitting written reports to his departmental jury would necessarily disclose his deficiencies and compel the discontinuance of his service. In the aggregate there were 852 judges appointed, distributed through the several departments in proportion to their magnitude. It is gratifying that we are able to certify that not to exceed six cases of incompetency were developed amongst the judges appointed, and only one case of doubtful integrity.

A general apprehension existed, that, under the system of awards (examining all of the exhibits upon an ideal standard of excellency with the great number of exhibits, there would naturally result an excessive number of awards, thereby cheapening the value of each individual medal or diploma by the greater number issued in the aggregate. It was proved by actual experience that the obligations imposed upon each individual examiner to report his conclusions in writing, and over his own signature, to become a matter of permanent and public record, and the high standard of excellence with which the comparison of exhibits was made, required such an amount of care, caution and exactness as to materially reduce the percentage of awards beyond those allowed at any previous World's Exposition. At the Vienna Exposition in 1873 there were in round numbers, 49,000 exhibitors, to whom, under the system of competitive awards, 26,000 medals were awarded. At Philadelphia in 1876 the number of exhibitors were 31,000 and upon a system of awards substantially analogous to that adopted at Chicago, there were 13,000 medals awarded. At the Melbourne Exposition in 1877 there were 9,000 exhibitors, and 6,000 medals awarded. At the Paris Exposition in 1889 there were 60,000 exhibitors and 32,000 medals were awarded. In the Chicago Exposition in 1893, exclusive of France and Norway, who withdrew from examination, there were 65,422 individual exhibitors, and the judges made awards to 21,000 individual exhibitors. Because of their representation, in some instance, in more than one group, they received 23,757 awards. The percentage of awards to exhibitors in these several fairs is as follows:

	Exhibitors.	Awards.	Per Cent.
1873, Vienna.....	42,000	26,000	62
1876, Philadelphia.....	31,000	13,104	42
1888, Melbourne.....	9,000	6,000	66
1889, Paris.....	61,722	33,889	55
1893, Chicago.....	65,422	23,757	36

It will, of course, be understood that the number of exhibitors is not the measure of the number of exhibits, because an individual exhibitor might have several exhibits in the same or different department, group or class. In fact, and as illustrative of the enormous labor performed by the juries of awards, over 250,000 separate exhibits were examined and reported upon, out of which accrued the ultimate total of 23,757 medals awarded.

It is proper to state that the system of awards adopted at this Exposition has worked out to a satisfactory and expeditious result with less friction than has occurred at any previous exposition. Taking the Paris Exposition, by way of comparison, there were more than 800 appeals filed there from the awards of the juries, 679 of which were allowed and different awards made upon the judgment of the Appellate court. In the Chicago Exposition out of 65,422 exhibitors, only 259 complaints were submitted in any form against the awards, and of that number only about 43 cases ripened into actual appeals. Of these appeals all have been adjusted excepting five, wherein the decision of the Court of Appeal has not yet been announced. In each of them the testimony has been taken, the arguments submitted, and the five cases are in the hands of the Court of Appeal awaiting their announcement of judgment. In these five cases there were circumstances of alleged exceptional importance and a Court of Appeals was created outside of the Committee on Awards and of any of the machinery connected therewith. Four gentlemen of recognized standing and character were selected and no complaint as to the fitness of their selection has ever been suggested. It is certainly a great tribute to the system of awards adopted and to the correctness of the methods used in carrying them into effect that such an insignificant percentage of complaints have been preferred. The showing is believed to be unrivaled in the history of similar expositions.

All the awards, excepting the five cases pending upon appeal, have from time to time been properly announced by posting on the bulletin boards of the respective departments of the World's Fair. It was intended, and preparations to that end had been perfected, to have had a formal and ceremonial announcement of awards in Music Hall on the World's Fair grounds on the 30th of October last; but the concurrent action of all the World's Fair authorities in suspending public ceremonies, because of the assassination of the mayor of Chicago, in closing the Fair, compelled the awards committee to rest upon their prior and more informal announcement.

In conclusion, the appropriation made by Congress will be ample to complete the entire work of awards. The force employed has been reduced about 75 per cent., a sufficient force being retained to make the necessary comparisons and revisions of clerical mistakes, and diplomas to exhibitors, when they have been delivered to it by the Secretary of the Treasury. That work is understood to be progressing satisfactorily.

In order to secure medals and diplomas of such artistic value as to be worthy of the United States as donor, the Secretary of the Treasury caused the medals to be designed by Mr. Augustus St. Gaudens, and the diplomas by Mr. Will H. Lowe. Those designs have been completed and the medals and diplomas are now being made under direct authority and supervision of the Secretary of the Treasury.

Yours Respectfully,

JOHN BOYD THACHER,
A. T. BRITTON,
A. B. ANDREWS,
W. J. SEWELL,
B. B. SMALLEY.

Attest: THOS. L. WILLIAMS,
Secretary.

BOARD OF LADY MANAGERS.

The Board of Lady Managers have performed a very important work in the Exposition, the extent, value and importance of which will be submitted to your Excellency in the final report to be made by the Commission. The following statement will show the condition of the finances of the said Board on the 1st day of January, 1894, the balance being sufficient to enable it to complete its general work:

APPROPRIATIONS.

Appropriation for fiscal year ending June 30, 1892.....\$ 36,000.00
Appropriation for fiscal year ending June 30, 1893.....110,000.00
Appropriation for fiscal year ending June 30, 1894.....93,190.00

Total appropriations.....\$239,190.00

EXPENDITURES.

Expended from appropriation for 1892.....\$ 28,251.30
Expended from appropriation for 1893.....75,613.32
Expended from appropriation for 1894.....84,128.77 \$187,993.39

Aggregate balance of unexpended appropriation.....\$ 51,196.61

RECAPITULATION.

Appropriation for fiscal year ending June 30, 1892.....\$ 36,000.00
Expended from above appropriation.....28,251.30

Balance unexpended from 1892.....\$ 7,748.70

Appropriation for year ending June 30, 1893.....\$110,000.00
Expended from above appropriation.....75,613.32

Balance unexpended from 1893.....\$ 34,386.68

Appropriation for year ending June 30, 1894.....\$ 93,190.00
Expended from above appropriation.....84,128.77

Balance unexpended from 1894.....\$ 9,061.23

Aggregate balance of appropriations unexpended.....\$ 51,196.61

In building, inaugurating, installing, and conducting the World's Fair, the World's Columbian Exposition, the Illinois corporation, performed a marvelous work which will also be properly treated in said final report.

In conclusion it is proper to state that throughout the conduct of the Exposition the most kindly relations were maintained with the foreign Governments participating therein, and to their friendly co-operation and that of the States and Territories of the Union, the great success of the World's Columbian Exposition is largely to be attributed.

I have the honor to be very respectfully,

Your Obedient Servant,

T. W. PALMER,

President of the World's Columbian Commission.

Attest: JOHN T. DICKINSON,

Secretary.

DESCRIPTION OF DIPLOMA.

The diploma, which is the work of Will H. Low, is pronounced a particularly fine piece of art. In the upper portion is an arch, through which is given a view of the Court of Honor and surrounding buildings, as if taken out in Lake Michigan looking down over the Peristyle. To the left of this arch is Columbia in a reclining position, resting on a buffalo's head and stretching forth her hand to three young Americans, located just to the left of the base of the archway birdseye view of the White City. These three young Americans represent the white, the colored and the Indian children of the land. The keystone of the arch is formed of the American coat of arms, with the eagle quite pronounced. Resting on a console in the upper right hand corner of the diploma form is Art, with the mechanical industries similarly represented on the opposite side. Below the arch giving the view of the Exposition grounds is the blank space for the language of the award, about eight inches square. The base line supporting Columbia and the young Americans is sustained by massive columns on either side, and inscribed on these columns are the names of the countries which by exhibition and otherwise assisted in making the Columbian Exposition a grand success. Just to the left of the space for the inscription of the award is the figure of Fame standing, tiptoed, upon the stern of a barge and handing to Columbia a laurel wreath. In the stern of the barge stands Columbus, with face and line of vision raised toward Columbia. His left hand rests upon the rudder of the bark and in his right he holds a globe, mounted with a cross. On the side of the barge is shown the coat of arms of the countries most prominently represented at the Fair, while the four figures which propel the craft are typical of Europe, Asia, Africa and South America. The blank space for the language of the award is intended to hold three hundred words of printed matter, the fac simile autograph of the individual judge, the attest of the international committee of judges by its presiding officer, and the autograph signatures of the proper exposition officials.

DESCRIPTION OF MEDAL.

One side of the medal is historical and the other emblematical. The historical side represents Columbus stepping from his boat. This view of the medal is not in the least perspective in design, that effect or quality having been cut off by the broad folds of the flag of Spain, which is borne by the sailor who stands directly behind the figure of Columbus, whose head is raised on high, giving thanks to the Almighty. The reverse or emblematical side is supposed to typify America. It represents a splendid specimen of lusty young manhood. This figure, entirely undraped, leans easily against a ponderous oak tree, and holds in his right hand three wreaths. In the distance stand the pillars of Hercules, bearing in scroll the legend "Plus Ultra." The oak is intended to typify great strength, and the boundary posts of the ancient world, with their legend, suggest how much the new world surpasses that known to the inhabitants of classic lands. The original plates have been so arranged that the name of the recipient will be placed on each medal and the whole will appear as complete as if each single medal was the only one struck off. It is possible some modification may be made in the nudity of the male form representing America by slightly draping it. Mr. St. Gaudens, of New York, designed

the medal, and it is thought to be the best effort of this well-known artist. Unless it is decided to change the appearance of the figure intended to represent America by draping it the medals will be ready for distribution by the date named in the report of the executive committee on awards to President Palmer.

Both the medals and diplomas are being prepared under the direction of the Secretary of the Treasury and will be given a skillful finish not previously approached in works of art of this character.

Each exhibitor upon whom was bestowed an award will receive one medal and one diploma, though he may also receive additional diplomas if awarded in more than one group; but only one medal will be given to an individual exhibitor regardless of the number of awards granted. It is a violation of law to reproduce or in any manner change the medal.

HOW TO OBTAIN COPIES OF DIPLOMAS.

Exhibitors who received awards at the Fair will be furnished with advance official copies of their diplomas by applying direct to Hon. John Boyd Thacher, chairman executive committee on awards, Pacific Building, Washington, D. C., and all communications relating to matters of awards should be so addressed.

MEETINGS OF BOARD OF CONTROL.

The board of control of the World's Columbian Commission, which board is clothed with all the authority of the Commission, held an adjourned meeting in this city about the middle of January. The question of obtaining means for compiling and publishing the history of the great exhibition was a matter which received consideration at this meeting. It is thought Congress will be asked to authorize the board to use a sufficient amount of the appropriation still standing to the credit of the Columbian Commission to meet the expenses of compiling, writing and publishing this history.

Books and Publications.

ELECTRIC LIGHT INSTALLATIONS. Vol. I. The Management of Accumulators. A practical handbook; 7th edition, revised and enlarged, with illustrations; 12 mo. cloth, London, 1893. D. Van Nostrand Company, New York. Price \$1.50.

This work is profusely illustrated and as the preface truly states, "presents to the reader a general survey of the practice of electric lighting and management of accumulators, with such recommendations as are likely to assist the reader in obtaining successful results. The popularity of the work is indicated by the fact that this is the seventh edition, which has been thoroughly revised and extensively enlarged by the author. This book fills a field on the subject of accumulators not heretofore filled by any scientific writer.

INVENTORS. By Philip G. Hubert, Jr., New York: C. Scribner's Sons; 8vo. 300 p.; cloth, \$2.

This book deals with the great inventors of the world, illustrating the trials and obstacles as well as the triumphs and success of the more prominent discoverers of valuable processes and inventions. It relates the experiences of such men as Benjamin Franklin, Robt. Fulton, Eli Whitney, Elias Howe, Samuel F. B. Morse, Chas. Goodyear, John Ericsson, Cyrus McCormick, Thos. A. Edison, Alexander Graham Bell, and others. The work is profusely illustrated and should be in the hands of every young inventor.

THE ELECTRIC TRANSFORMATION OF POWER AND ITS APPLICATION BY THE ELECTRIC MOTOR, INCLUDING ELECTRIC RAILWAY CONSTRUCTION. By Philip Atkinson; New York: D. Van Nostrand Company; 12 mo. cloth, \$2.

The author in the preface best tells the scope of the work when he says that "the design of the book is to give, in plain, untechnical language, the essential facts in regard to the means by which electricity is employed as an agent for the transformation and transmission of power, and its application to the operation of machinery." The principles of the electric motor and its application to various kinds of mechanical work and railway use, are fully set forth.

HOW TO MAKE INVENTIONS, OR INVENTING AS A SCIENCE AND AN ART. An Inventor's Guide; by Edward I. Thompson, M. E.; No. 5 Beekman Street, New York, enlarged and revised, cloth 180 p.; \$1. D. Van Nostrand Co., New York.

The standing of the author as a mechanical engineer and electrician entitles and insures this work careful and respectful consideration. One cannot read its pages without feeling repaid. It contains technical knowledge of value to every inventor or student of mechanics. It will prove alike instructive to one who has already invented something of worth and to the person whose inventive genius is just budding, so to speak. It is probably the greatest instructor yet written. The *New York Recorder* says: "The book is practical from the word 'in' at the beginning to the portentous declaration that we are 'at the beginning of inventions' with which it closes." The *Discovery*, London, England, says: "The author is a well known patent solicitor."

ELEMENTS OF HANDICRAFT AND DESIGN. By W. A. S. Benson, with illustrations, New York: Macmillan & Co; cloth, \$1.60.

THE UNITED STATES PATENT OFFICE.

Suggestions for an Improvement in the Personnel of the Officers.

[Paper read before the American Association of Inventors and Manufacturers by Arthur Stenart.]

The duty required of the Examiners and Examiners-in-Chief of the United States Patent Office, and of the Commissioner and Assistant Commissioner of Patents, are so technical, so arduous and require such a wide range of education and experience that it is of the highest importance that the very best men should be secured for those positions and that their services should be retained by the Government during their lives. To accomplish this result it seems to be necessary only to do two things. First, to remove the Patent Office entirely from political influence; and second, to make the positions of Examiners and Commissioners so desirable that the best men will seek them, and having once secured them devote their lives to the fulfillment of the duties required. These same conditions and necessities exist in the United States Army and in the United States Navy, and in both of these branches of the Government service the ends which we desire to attain in the Patent Office are attained by a very simple and efficient system; that is to say, all appointments are made after proper qualifications and examination to the lowest grade in the service and all the higher grades are filled by promotion. A few high prizes are offered in the form of large salaries to the highest officers, and all officers are given the assurance of a support in old age by a suitable pension.

There is no branch of the Government service, the Army and Navy excepted, where highly equipped and honorable men are more needed than in the Patent Office, and when once secured, where they should be more surely retained than there. All this advantage can be gained by several simple changes in the law governing the appointment of Examiners and Commissioners, and the incorporation of a civil pension system for superannuated officers.

1. If all appointments were limited to the lowest grade in the examining corps and all other appointments made by promotion, independence and permanence would result, and we would be sure of having a permanent Commissioner of Patents who would know the law and the practice and be enabled to establish a uniform and consistent practice.

2. If the pension system could be established it would go far to cause the best men to remain in the service, feeling secure that when they were superannuated or died they would have or could leave a pension large enough for their necessities or those of their families. The Examining Force, Board of Examiners and Commissioners consist of about 140 men. It would be fair to estimate that not more than 25 per cent. of this number would be on pension rolls at one time. The average salary of the Examiners and Commissioner is about \$2,000. If 25 per cent. or even 50 per cent. of 140 Examiners be on the pension roll at one time, say 50 per cent. on half pay, this would be 70 at \$1,000 or \$70,000 a year. The office could pay this out of its annual surplus and have a large amount over and above to turn into the United States Treasury.

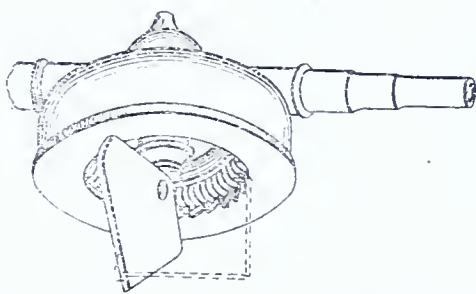
Another possible plan would be to increase the present salaries of the Examiners, say by the same amount of \$70,000; this would be an average of \$500 a piece or an average of \$2,500. This increase would, I think, operate less beneficially in increasing the stability of the force and securing the best men to remain in the service for a life time than the Pension System.

Field's Improved Gas Burner.

Presented herewith is an illustration of Mr. Benjamin F. Field's important improvements in Gas Burner Attachments. The primary object of this invention is to produce a device which will operate to automatically close the valve, not withstanding the careless actions of an operator. This end is attained by arranging around the valve spindle a circular frame, within which a spiral spring is located; one end of this spring is fixed to a stud on the frame, while the remaining end is connected

with an arm, which is in turn connected to the valve spindle.

The spring is so arranged that it will keep, by means of the arm aforesaid, the valve closed, and



the handle of the valve is made to operate as a pawl and in conjunction with a ratchet fixed on the frame, whereby the valve may be opened, against the tendency of the spring, and kept so when the burner is in use. As soon as the pawl is released from the ratchet the spring will automatically close the valve.

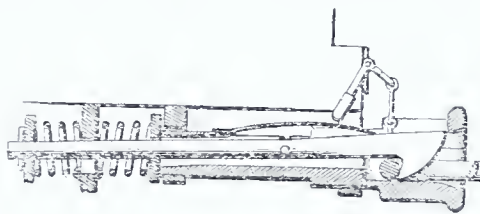
By this means it will be seen that it will be impossible for one to leave the valve open by carelessly turning off the gas, since the valve will be closed by the spring unless care is taken to engage the ratchet and pawl-handle, and this will not be done when it is the operator's intention to turn off the gas. Mr. Field will exhibit his invention in operation at the Midwinter Fair in San Francisco, and owing to the simplicity and consequent cheapness, the invention is expected to meet with great success.

The inventor's address is 205 New High St., Los Angeles, Cal.

An Improved Car Coupler.

The INVENTIVE AGE presents herewith an illustration of an improvement in car couplers which it is believed has many advantageous features. The essence of the improvement lies in an arrangement wherein the draw head is relieved entirely of the strain, and this put upon a supplemental draw-bar, which is extended to form a hook for engaging the link of the adjoining car.

This auxiliary draw-bar is connected to the car through the medium of two stout springs, which are arranged to receive the strain and thus dispense with the jar incident to the movement of the cars, while the forward or hook-end of the draw-bar is held in position by a spring arranged above it. Crank and link mechanism is provided by which the hook may be raised and consequently disengaged from the link.



It is thought that the advantages of this construction will be readily appreciated, since by it the entire strain is placed upon the two springs attached to the draw-bar, thus making the parts which must necessarily play with the motion of the car as few as possible, and consequently doing away with the liability of disarrangement. The inventor of this improvement is Mr. Simon Stump, of Great Bend, Pa.

Electric Cloud Projector.

There is now installed and in successful operation on top of the World Building, New York City, a cloud projector used for throwing advertising signs on the clouds or on tall buildings, which is attracting a great deal of attention. It was designed and installed by Mr. L. H. Rogers, assistant manager of the Brush Electric Company, of Cleveland, O. Mr. Rogers, after several years of experimenting, has produced an entirely successful apparatus for accomplishing the desired purpose. It is a wonderful apparatus, constructed on scientific principles, entirely different from those of the magic lantern, and will throw the image of an individual or words thousands of feet upward on some passing cloud, where it may be seen with perfect distinctness by the people below.

Frivolous Patents.

It is reported that a large number of applicants for patents are now being rejected as "frivolous" and of no commercial or industrial value. The applications for patents for unpatentable articles is increasing daily, and hereafter the examinations will be more severe.

MONSTER 13-INCH CANNON.

(Continued from first page.)

spectators and the process is watched with keen interest, for if any accident occurs, and the fitting is not absolutely accurate, it involves considerable loss to the Government, particularly in guns of considerable length. The famous Krupp gun, the largest ever manufactured, was 40 feet long and 13-inch calibre. The even dozen now being manufactured by this government are 38 feet long, 13-inch calibre.

Attempts have been made to remove the jackets, when they have been found to be gauged inaccurately, but all efforts in this direction have been in vain, as the jackets could not be taken off by any method of wrenching, heating or cooling, and the only way yet discovered to remove a jacket or tube is by the slow and tedious process of boring.

Cannon are manufactured at the Washington Navy Yard Gun Foundry of various smaller calibres, but they are all pigmies as compared with these colossal 13-inch breech-loading rifles, which weigh about 65 tons each, and which seem at first thought so heavy they could never be carried by any vessel. Yet they have been designed and will be carried on board the great battle ships named. Even these great guns are eclipsed in weight by those on some of the British men of war, the largest of which weighs 87 tons. These immense masses of steel have proved too cumbersome when exceeding 75 tons, and the British Admiralty has recently decided to discontinue manufacturing them. American naval experts believe in the greater efficiency and economy of smaller ordnance, and it is probable that few of these large-sized rifles will be manufactured in the future.

INVENTIVE AGE readers who have not been favored with an opportunity of personally inspecting this kind of ordnance, made by improved methods and of the best quality of material, can see in the illustration a faithful representation of the most terrible weapons of our new navy. They are the "peace-makers" of our commercial world and represent the genius and accomplishments of modern naval experts who have been called upon to perfect a gun which will carry a projectile the longest distance with the greatest penetrating power. The result, as shown, is a triumph of American enterprise and engineering skill, and places this nation as independent of foreign workshops for efficient ordnance, as we are free from European methods and manufacturers in designing and constructing great battleships.

The "Age" as an Advertising Medium.

The correspondence received from advertisers in the INVENTIVE AGE indicates the value of these columns as an advertising medium. Here are a few specimens:

WANTED TO BUY AN INVENTION.

CLEVELAND, OHIO, Aug. 3.

Inventive Age, Washington, D. C.
DEAR SIR: For heaven's sake pull out my advertisement in your paper, headed "Of Interest to Inventors." I think it took, I say I think; I know it took. It has taken about all my time to answer letters regarding it ever since the advertisement was inserted. I have got a big box full of plans, specifications, and nearly a barrel full of models. * * * Respectfully,
A. H. DICKEY.

WANTED AN INTEREST IN GOOD THING.

INDIANAPOLIS, IND., Dec. 20.

Inventive Age, Washington, D. C.
GENTLEMEN: When I advertised in the AGE that I wanted to buy an interest in a good patent that could be manufactured and put on the market at once I had little idea of the result. I have received more propositions than I can investigate in a year. Enclosed find \$1 for INVENTIVE AGE another year. I wouldn't be without it. Yours truly,
JOS. ANDERSON.

FOUND WHAT HE WANTED.

LEXINGTON, KY, Jan. 8.

Pubs. Inventive Age, Washington, D. C.
GENTS: My advertisement in your paper for "someone who owned a good patent requiring the investment of a little money and a great deal of energy" brought me in communication with a large number of inventors. I wish I had more capital. There are many readers of your paper who have good inventions needing development and push. They ought to use your "Bargain" and "For Sale" columns more freely. Yours,
E. D. BEACH.

FROM FAR OFF INDIA.

NAVSARI, NEAR BOMBAY, INDIA, Dec. 12.

Editors Inventive Age.
GENTLEMEN: I renew my subscription and enclose herewith \$1.25 for it and a copy of "Picturesque Washington." I derive great benefit from your "Patents for Sale" column and have already taken six useful articles to be introduced in this country. Inventors should advertise more than they do in that column as it will interest investors. Faithfully yours,
KH. M. TATA.

SEVERAL interesting articles are crowded out of this issue, on account of the proceedings of the American Association of Inventors and Manufacturers. Article IV of the International Convention of 1883, read before the Patent Congress in Chicago, by Examiner Seely of the Patent Office. "Our Youths' Department," by Prof. Lewis of Johns Hopkins University, and other features will appear next month.

Primitive Inventions.

I have never talked with one of our modern geniuses on the subject, but it has occurred to me that all inventors are, in their creative moods, in a kind of hypnotic state. The best authorities on hypnotism tell us that the patient is put into such a condition of mind and body that mere suggestion is equivalent to action. Now, the primitive and savage inventors, among whom I have passed my days, seem peculiarly under this quasi mesmeric state. The "lunatic, the lover and the poet" are said by a good authority to be "of imagination all compact." But the inventor is also in some such mood. In tracing up the origin of any savage tool, process, artistic or industrial product one must never fail to look in nature for the suggestion. It may be that the crying want or desire has put the mind into this unusually sensitive condition, has made the fingers more deft, the eye more observant. Be it so. When the man turns his eyes about him or any other one of his senses is stirred, he at once has revealed to him a world of whispers. The fruits and tissues and woods of plants, the qualities of rocks, the parts and the conduct of animals each say, look at me, try me, imitate me. A few examples will suffice. As to a home. Wherever animals burrow, men dig cellars or live underground. If man had been on this earth before the mammals, then the latter may have been instructed by the former. But animals were first. The polar bear sleeps under the snow, foxes have holes, wolves have caves and many creatures have dens which have been imitated in human habitations by suggestion. In the country of the tent and built up cabin, beavers and other rodents cut down trees and hauled timber long ago. Their achievements have been overrated, but the cunning inventor needed only a suggestion to give him a start.

The same is true of the arts. Birds were weavers, spiders were spinners, caterpillars made soft textiles and even some of the plants effected warp and woof in the arrangement of their fibres before the appearance of man. Everywhere these processes or objects obtruded themselves before the eyes of our race from the first. Unless there be some positive evidence that our race has been hundreds of thousands of years on the globe, there is no *a priori* necessity for such duration in the development of art, and inventions. In the study of pottery, however, are the best examples of this quasi mesmerism. The material, with all its weaknesses and limitations, is still the most tractable. The aboriginal potter, therefore, is always getting suggestions from outside how to make it up. For example, the Florida Indians used to drink out of *Busycon* and other shells, but some one has dug from an Arkansas mound a good copy of one of these shells in clay. The number of proofs at this point are without limit. The Indian potter's eye no less than the civilized poet's

Doth glance from heaven to earth, from earth to heaven;

And as imagination bodies forth

The forms of things unknown, the potter's hand turns them to shape,

and gives to mere suggestions a new and pleasing substantiality.

In striking contrast with those hours when the mind is under this exalting inspiration of nature are the other and far more numerous hours when we lead a quasi automatic life, merely following suit. It is to these the question was addressed, are we merely automata? But I come back to the modern inventor and ask him whether the same process of stimulating suggestion which manifests itself in the savage is not his motive power in presence of the imperfect works of other minds.

O. T. MASON.

The Palmetto Trade Mark Case.

A Trade Mark is a name, symbol or device used by a manufacturer or merchant, to distinguish the merchandise which he produces or sells from that of others, in order that such merchandise may be known as his, and that he may secure the profits arising from its production for superiority, and before the same can be issued it must appear that it has been

or is to be used in a foreign trade or with an Indian tribe.

One of the most noted Trade Mark cases brought to the attention of the public in many years is that now pending before the District Court of Appeals of the District of Columbia, and known as Gov. Tillman's Trade Mark for the liquor dispensaries established by the Statutes of South Carolina. The application was made to the Commissioner of Patents, asking that a Trade Mark be granted on the word "Palmetto," and it was intended to be used to distinguish a brand of liquor to be sold at the dispensaries under the South Carolina liquor law.

The application was rejected by the Commissioner of Patents on the ground that the State had no authorized trade in liquor outside of its limits, and on the further ground that the State was not authorized under its law to trade either with foreign countries or Indian tribes but may only trade within the limits of the State.

Upon refusal of the Commissioner to register the Trade Mark, the State applied to the Supreme Court of the District of Columbia for a writ of mandamus, requiring the Commissioner of Patents to register the Trade Mark as applied for by the State which order was granted by the Supreme Court, and from which order the Commissioner of Patents appealed to the District Court of Appeals where the case is now pending—the same having been argued by counsel on both sides, but no decision has as yet been rendered.

The case involves several very intricate and important questions, the most important of which may be said to be the right of the State to acquire the property or privileges conveyed by Trade Marks.

One question is that of citizenship, as under the law, every applicant must record in the Patent Office his name, residence and place of business, the class of merchandise and a particular description of the goods, in such cases in which the Trade Mark has been or is intended to be applied, and the person applying must either be a citizen of the United States or have filed his declaration of intention to become such.

The Commissioner of Patents further contends on his part, that he is authorized to judicially determine the legality of the business of persons claiming the right to register Trade Marks, and that a mandamus will not lie to compel him to perform a judicial function, but only lies where the duty to be performed is purely ministerial. This Trade Mark is sought by the State to assist in carrying out the provisions of the statutes of the State of South Carolina in relation to the sale of liquor within its limits, and as there does not appear to be any Indian tribes within the State with whom it would trade, it would seem that under the broad construction of the law heretofore given as to Trade Marks with a foreign country or Indian tribes, there is great force in the Commissioner's holding.

The decision will be awaited with interest on this point as well as on the question of the right of the State to act in the capacity of what has heretofore been held to be a person or a corporation. The State was represented in the case by Messrs. J. Althaus Johnson and James Edgar Smith, and the Commissioner by Messrs. John I. Hall and Levi H. Campbell.

Important Changes in Patent Office Rules.

Commissioner of Patents Seymour has repealed Rule 64 of the practice and established the following in lieu thereof:

"When the specifications and claims are such that the invention may be understood, the examination of a complete application and the action thereon will be directed throughout to the merits, but in each letter the examiner shall state or refer to all his objections. Only in cases presenting patentable substance will requirements in matters of form be insisted on."

A new order, No. 986, relates to drawings, and is as follows:

"Erasures or other alterations of drawings will not be made or permitted except in compliance with this order. Applicants are requested to furnish with their originals a blue print or other photographic copy of all drawings forming part of an application, and where this is done the original drawings may be taken to the attorney's room, but not otherwise.

"Before making a requirement to alter an original drawing the examiner will formally make the blue print or other copy a part of the files, and in case no such copy has been furnished by the applicant the office will make such copy without charge, and thereupon the required alteration may be made by the applicant, under the direction of the examiner and subject to his approval, or, upon request, it will be made by the office at the expense of the applicant.

"The requirement to make alterations in original drawings will be made in writing, and the applicant's response must also be in writing, and in such case the copy of the drawing, the requirement to alter, and the applicant's response will form part of the record. Action by the office on the merits will not be suspended pending the change of a drawing, if the invention claimed may be understood by the examiner. For the purposes of this order the office, upon the request of applicants, will make blue prints at the charge of 5 cents a sheet.

"In appeal cases and upon the declaration of an interference a blue print or other copy will be sent forward with the files, the examiner retaining the original drawings in his room until the hearing. Except as herein required such blue print or other copy will not be made a part of the file, and may not be preserved after an application passes into a patent.

Conduit and Overhead Trolley Systems.

By EDWARD P. THOMPSON, M. E.

When, a few years ago, it was proposed to put all wires underground in New York and other cities the cry was almost universal that it could not be done. The difficulties pointed out as the reason were overcome by the combined action of the inventor and the engineer, illustrating that the presentation of objections in an impartial manner may be the impetus which leads to success.

Those who propose to enter the field for the purpose of obtaining the generous reward of \$50,000 offered by the Metropolitan Traction Co., of New York City for a successful substitute for the overhead conductor system will undoubtedly be very few in number, owing to the great difficulties to be overcome. It has been stated erroneously that the conduit is as serviceable as the overhead, because both are substantially the same thing—merely a trolley under, instead of over, the car. The object of this article is to point out by brief and terse sentences certain facts which seem to prove serious difficulties.

The underground conduit is comparable to a cellar—always damp. Whether pleasant or stormy the insulators have a film of water, while in the overhead they are damp only during unpleasant weather. Leakage therefore occurs at each insulator continually. The prolonged dampness also causes chemical changes and a reduction of resistance. During heavy storms all sewers and drains are overloaded and the wires are flooded and short-circuited. Roads are the dustiest of dusty places, and consequently the electrically conducting particles from horseshoes, wagon tires and scores of other substances collect on the insulating supports, becoming an additional source of leakage and one not found in the overhead to any injurious extent because so elevated and because the rain can be permitted to wash them now and then.

A conduit is practically inaccessible, as compared with the overhead, for renewal of insulators, joining of broken wires, removal of trolley, painting, cleaning and incidental operations.

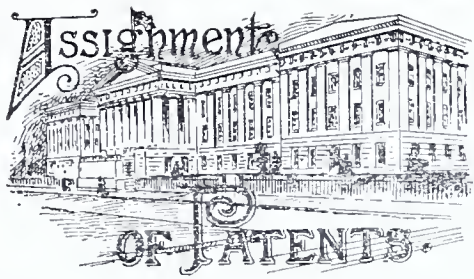
The trolley jumps off of the conductor in the overhead system as well as in the conduit, but it may be easily replaced in the former.

How common it is to see overhead trolley-car tracks and conductors crossing and curving and switching and apparently in great confusion; but at the same time the tracks and conductors are respectively below and above the cars. With the conduits there is such unending confusion that those who have exhibited experimental conduit systems generally simplify the crossing and switching features by "talk." There must be some missing link or else they would show it in order to prove the universal application of their systems. As compared with the overhead a radical difference appears; for in the latter it is a frequent sight to see the trolley lifted temporarily or replaced after jumping off at a branch or turnout. If a trolley will not stay on in the overhead system neither will it in the conduit, arguments as to the guides' efficiency notwithstanding.

The writer has scarcely ever seen an underground conduit system without manholes, and he has seen these left open and unguarded and the deadly current full on, all in condition for children to jump into and play and die. No manholes are necessary for the overhead system. In one instance such a system involved as a permanency a manhole to be opened at each approach of a car and a lantern to guard it at night. Would such an obstruction in a beautiful street, where the overhead system is objected to, recommend the conduit as a substitute?

In winter the snow on the overhead conductor does little harm because the trolley bears on the under surface; but with the conduit the snow and pieces of ice choke the slot. I saw the latter kind of system in operation on one railway which was accompanied by a very tall colored man (as it were, a part of the system) running ahead of the car with a stick to remove pieces of ice and hard snow which were wedged into the slot by a team ahead. The people watched him as they would a tight-rope walker, expecting to witness an accident.

The comparative and larger first cost is not entered as a difficulty, because the conduit would cost no more than a cable conduit, which has been reduced to an economical design.



Under this heading is published all assignments of patents or partial interest in same, as on record in the United States Patent Office for the month ending January 17, where the consideration was \$2,000 and over.

Martin Burns inventor, to Frank H. Gorton of Perry, Oklahoma Ter., Corn Harvester; half of all his right for U. S. \$10,000.

Claude Bennett inventor, to Frank Chapman, of Cass Co. Mich., Combination Milk Pail; undivided one half interest for U. S. \$15,000.

Geo. W. Bufford, inventor, to James H. Williams, and others of Brooklyn, N. Y., Pipe Tongs; whole right for U. S. Consideration. \$2,750.

David L. Berry, and Jesse Wheeler inventors, to Lewis F. Crandall, of Mosca Colo., Barrel Racks; two undivided thirds for state of California. \$3,500.

Wm. Bader inventor, to Willis C. Vajen, of Indianapolis, Ind., Fireman's Smoke Protector; one undivided half of his right for U. S. \$5,000.

Daniel W. Cole inventor, to Wm. W. De Wolf, of Ottawa, Kans., Hydrocarbon Burners; his entire right for U. S. \$10,000.

James F. Chesebro inventor, to the Chesebro Inhaler Co., of New Jersey, Vaporizing Inhalers; exclusive right for U. S. \$14,000.

Geo. J. Climo inventor, to Sylvester R. Roose, Goshen, Ind., Fence Wire Lighteners; one half of right. \$5,000.

Wm. T. Cutter inventor, to Edward R. Faxon and others of Granby, Conn., Process of Extracting Fat from Wool; all his right for state of Connecticut. \$5,000.

Chas. E. Cookerly inventor, to R. S. Searle, Jackson Co., Mo., Hydro Carbon Burner; right for U. S. \$2,500.

David H. Coles inventor, to W. F. & F. C. Sayles, of Pawtucket, R. I., Sewing Machines; right for U. S. \$5,000.

Hendrick B. Cease inventor, to the Lincoln Press Drill Co., of Lincoln, Ill., Grain Drill; all rights. \$6,335.

Arthur T. Collier inventor, to the American Bell Telephone Co., of Boston, Mass., Telephone Receivers; all rights. \$7,500.

Samuel Davis and Frederick G. Davis inventors, to the Davis Washing Machine Co., of Las Vegas, New Mexico, Clothes Pounders; all rights. \$24,500.

Wm. W. Davis inventor, to James C. Slater of Linnens, Mo., Telephone System; one undivided half interest in said invention for states of Missouri and Kansas. \$10,000.

Chas. H. Fox inventor, to Warner J. Hodge, of Daunt, Cal., Refrigerator; an undivided one-half interest in said invention for U. S. \$2,000.

Ernest Finch inventor, to the Cone Fire Clay Co., of Salineville, Ohio, Chimney Tops; all rights for state of Ohio. \$2,550.

Newton Z. Fulton inventor, to Daniel J. Splane, of Gunnison Co. Colo., Cube Boxes; one half interest in his invention for U. S. \$10,000.

Archibald Ford inventor, to Lincoln Davis, of Tacoma, Wash., Gas Regulators; all rights for state of Minnesota. \$5,000.

Daniel D. Frisbie inventor, to Ann A. Voorhis of the Township of Pontiac, Mich., Fences; all rights for states of Indiana and Ky. \$4,000.

Wm. H. Johnson inventor, to Chas. G. Human, of San Antonio, Texas, Change Makers; all rights for U. S. \$5,000.

Hosmer I. Jackson inventor, Gilbert G. Webster, of Great Bend, Ohio, Carpet

Stretcher and Jack; an undivided one-half of right. \$5,000.

James M. Kirker and Frederiek M. Bender inventors, to the Kirker & Bender Fire Escape Co., of Louisville, Ky., Fire Appliances; all rights for U. S. \$5,000.

Frank W. Kline and Geo. G. Thomas inventors, to W. A. Vannatta, of Edison, Ohio, Neck Yokes; all rights for U. S. \$5,000.

Bernard Kern Jr., inventor, to the Kern Street Cleaning Co., of Toledo, Ohio, Street Sweepers; exclusive rights. \$25,000.

Oliver W. Ketchum inventor, to Arthur B. Lee, of Toronto, Canada, Gas Producers; one undivided third. \$4,800.

Wm. C. Lockwood inventor, to C. Fontannaz, Secondary Batteries; an undivided one fourth of all right. \$5,000.

Samuel W. Ludlow inventor, Ludlow, Ward & Losh assignors, to Walter S. Ludlow, Fire Alarm Apparatus; all their rights for Hamilton Co., Ohio. \$10,000.

Theodore F. Le Massena inventor, to Clarence E. Le Massena and others, of Newark, N. J., Polishing and Grinding Wheels; the whole right. \$5,825.

Judson A. Elliott inventor, to Wm. R. Davis, Nursery and Lawn Car; undivided interest in eight states, and two territories. \$7,500.

Geo. H. Nicholls inventor, to the Quick Cooker Co., of Galveston, Texas, Cooking Utensils; the whole right for U. S. \$10,000.

S. E. Nulting inventor, to Eugene Clifford, Electric Arc Lamps; all right. \$50,000.

Jens Nielson inventor, to the Danish Milking Machine Co., of Hartland, Wis., Cow Milker; all rights for U. S. and territories. \$9,000.

Sarah M. Hoyt inventor, to the Illinois Washed Gravel Co., of Ill., Centrifugal Screen; exclusive right to use in certain territories. \$225,000.

Geo. H. Holgate inventor, Amos E. Griffiths, of Philadelphia, Pa., Water Closets; all rights. \$20,000.

Chas. Hammons inventor, to Cecelia A. Brewer, of La Porte, Ind., Washing Machine; all rights. \$3,500.

James E. McAlpin, and Geo. H. McAlpin inventors, to the McAlpin Chemical and Mfg. Co., of Ill., Fire or Water Proof Paint; all rights for five states. \$50,000.

Phares M. Mishler inventor, to Homer Brawle, of Chicago, Ill., Hedge; all rights for five states. \$5,000.

Prosper A. Marignen inventor, to Marignen's Filtre Co., of London, Eng., Compound for Purifying Water; whole right. \$7,500.

John N. Parker inventor, to W. H. Mott, of Coldwater, Mich., Combination Tool; all rights for one half of U. S. \$6,000.

Gustave Otto inventor, to the National Capsule Co., of N. J., Capsule Machine; all rights for U. S. \$10,000.

Andrew I. Smith inventor, to V. P. Mooney and others, of El Dorado, Kans., Combined Jack Driver and Carpet Stretcher; undivided three fourths of his right. \$3,000.

Albert Weck inventor, to the American and Automatic Knife and Novelty Co., of Brooklyn, N. Y., Pocket Knife; all rights for U. S. \$5,100.

James Weathers inventor, to Norman Woolton & W. K. Norris, of Washington, D. C., Lifting Jack; all rights for state of Georgia. \$2,000.

The "White City" Fire.

The great fire at the Cold Storage Building was eclipsed in point of damage by the recent great conflagration at the Fair grounds. Fortunately the loss of life was not so appalling as at the holocaust of August. The recent fire, the work of tramps it is believed, consumed the Casino, Music Hall and that portion of the Peristyle fronting on the lake. The great Manufacturers Building was also damaged considerably and goods of exhibitors, packed in cases ready for shipment, were damaged to the extent of about \$150,000.

Industrial Notes.

A vessel built entirely of aluminum has been launched by the French.

Wine is so plentiful in the south of France it sells for one penny a quart.

The Hardware Merchants & Manufacturers' Association protests against the passage of the Wilson bill.

President Nathaniel Wheeler, of the Wheeler & Wilson Sewing Machine Company, Bridgeport, died Jan. 1, aged 74 years.

Americans have secured the privilege of building an electric road between Tokio and Yokohama, Japan, a distance of thirty miles.

The Automatic Phonograph Exhibition Co., of New York, has gone into the hands of a receiver. The assets are stated to be \$1,000 and the liabilities \$36,000.

Although an inland city the duties collected on imports received during 1893 at Chicago amounted to \$8,289,222.52, a sum larger than any of the seaboard cities except New York.

The Southern Chapter of the American Institute of Architects met in Augusta, Ga., Jan. 9. M. J. Dimmock, of Richmond, Va., was elected president for the ensuing period.

W. H. H. Peterson, of Milwaukee, Wis., has invented an electric railroad system, which he thinks will fulfill the requirements set forth in the recent offer of \$50,000 by the Metropolitan Traction Company, of New York.

Dun's reports show that in 1893 there was a decrease in the output of pig iron of 38 per cent. Nearly half the woolen manufacturies were idle in December and the sale of cotton goods one quarter below the usual quantity. There were 16,650 failures reported in 1893.

The production of the pottery industry in the United States amounts to about \$10,000,000 and the capital invested is about the same. The United States Potters' Association met in Washington January 9 and was attended by representatives of the industry from all over the United States.

A Virginian proposes to settle the problem of aerial navigation by training wild geese to fly as directed, harnessed to a balloon that will of itself suspend the weight of passengers bound for any part of the country. He claims to have already trained a flock to propel a wagon on land at the will of their master.

In *The Tradesman Annual* of January 1 it is stated, in the article on manufacturing in the South, that the first iron made in the Southern States was from a furnace in York county, S. C., erected in 1772 by one Buffington. It is also stated that the descendants of Buffington figured in the iron business in after years and that a man by this name built a small furnace at Ball Play, Monroe county, Tenn., in 1849.

Adam M. Hunt, of Stamford, Ontario, has been granted a patent on a grave vault on the following claim: "A latent life safe or grave vault, consisting of a hollow box, preferably of non-corrosive material, placed on a hinged shell and coffin in a grave, and having a hinged cover, and a hinged lid to the cover, and devices for opening the lid by a slight upward pressure from the occupant of a grave, if buried alive in a state of coma, and having rungs or steps by which to ascend out of the grave upon return to consciousness."

California Excursions.

The well known Phillips Excursion Company have arranged to run weekly excursions to all principal California and other Pacific Coast cities from all points on the Baltimore & Ohio R. R. The parties will leave the East on Wednesday of each week, commencing January 17th, and passengers will be booked through to destination. There are no Pacific Coast tours offering as good accommodations at less expense. For full information address A Phillips & Co., No. 111 S. 9th Street, Philadelphia, or call on nearest ticket agent B. & O. R. R. Co.



A German professor has exhibited photographs electrically taken which show a projectile in transit and the actual air waves caused by it in its flight.

Even in this semi-tropical climate the blasts of winter are sometimes severely felt. Our electric and cable car drivers ought to be protected from the storms. In Ohio it is against the law to expose motormen and gripmen while at work. It is a beneficent statute and should be in our District laws.

The life guard for all kinds of electric and grip cars seems to be imperatively called for and the inventive genius of this fast age should likewise produce a guard for the propelling current of trolley cars which will do away with the vital objection to their introduction into crowded cities.

An ingenious electrical apparatus has been devised which will indicate the precise time that an earthquake shock strikes a given locality. It consists of a chronometer which is photographed by the light of an electric lamp instantaneously lighted by a current established by the shock. It is said it works well.

If, as it has been said, the light of a certain star takes 141 years to traverse the distance to the earth, a sufficiently powerful telescope on the surface of the star would reveal at this time Benjamin Franklin flying his kite to catch the lightning in the fields at Philadelphia, this event having taken all this time to reach the heavenly body.

A professor of electricity in England was called upon to prescribe for a sick dynamo and after a careful examination wrote out his prescription, which read as follows: "Duster and broom," whereupon a member of the Institute of Electrical Engineers, at a meeting recently gave out that the "most important capacity effect on a dynamo is its capacity to hold a charge of dirt."

Prof. Nikola Tesla has designed a steam engine to be used to generate alternate currents, which is called a vibratory steam engine, by which he claims a mechanical efficiency of 99 1/2 per cent. instead of 82 per cent., which is the present standard, and he claims that twice as much electricity can be generated from a given amount of coal. Truly a marvelous saving.

A device for signalling from shore to sea has been invented by an Englishman. It is based on the well known principle that if a musical note is sounded an object normally tuned to send forth a similar note will be sympathetically excited so as to respond if it be within reach of the vibrations. There are important practical results depending upon the success of this invention.

Henry Goebel, the alleged inventor of the electric incandescent lamp, and Prof. John Tyndall, the great English scientist, have passed away since our last issue. They were both renowned for their scientific attainments and especially for researches in the field of magnetism and electricity. Prof. Tyndall's investigations were not confined to any particular branch of physics, but he spent the greater part of his best years in the domain of electricity and magnetism.

"Tips to Inventors."

This is one of the most instructive and useful works for mechanics and inventors. Its author is Robert Grimshaw, M. E., and the book, cloth bound, retails for \$1. The *INVENTIVE AGE* for one year and "Tips to Inventors" will be sent to any address for \$1.50.

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE, which keeps inventors posted in the art in which they are mostly interested. — The full address of any patentee, and number of patent found below sent to any address on receipt of one 2-cent stamp. — We will send, postpaid, to any address, printed copies of any U. S. patents, with specifications and drawings, upon receipt of 20 cents for one copy; 35 cents for two copies; 50 cents for three copies. — (See premium offer elsewhere in this issue.) — Address THE INVENTIVE AGE, 8TH AND H STS., WASHINGTON, D. C.

List of Patents Issued January 2, 1894.

Apparatus for changing liquids with carbonic acid. Acid monamid. Mechanical advertising apparatus. Agricultural machine. Air and water purifier. Alarm. Ammeter and voltmeter. Anchor. Architectural decorative material. Antoharp. Automatic sprinkler. Awning-elevating attachment. Ax-helve. Axle 2.

Bail for pots, pails, &c. Baking-pan. Baling-press. Machine for baling trees. Ballot-box. Automatic band-cutter. Battery. Spring bed. Bedstead brace. Folding bedstead 2. Apparatus for and process of making carbonated beverages. Bicycle attachment. Bicycle lantern holder. Bicycle saddle 2. Bicycle wheel mud guard. Billiard cue tipping rack. Temporary binder. Bit. Blast furnace. Making chlorate blasting powder. Block. Board. Boat engaging and disengaging gear. Boiler. Steam boiler attachment. Steam boiler furnace. Boat rearing machine. Boring brace. Bottle stopper. Manufacture of bottles. Box fastener. Box or drawer. Method of and apparatus for treating brewers' grains. Brick kiln. Bridle bit. Bath and flesh brush. Buck band buckle. Building block.

Cabinet maker's clamp 2. Cable grip. Electric call. Can capping machine. Can opener. Electric alarm for cane feeders. Car brake. Car coupling 8. Car door 2. Ore car. Railway car safety guard. Car seat. Antifiction side bearing for cars. Apparatus for heating railway cars. Carbon machine. Carbon mold. Process of and apparatus for carburizing air. Carding engine. Carriage underworks. Blasting cartridge. Cartridge shell battery. Cash carrier. Ingot casting mold. Core for casting radiator sections. Adjustable catch plate or striker. Manufacture of cement. Driving mechanism for centrifugal separators. Combined chair and step ladder. Furnace chill. Cider press. Cigar box moistening device 3. Cigar bunching machine. Cigar crimping and stamping machine. Cigarette machine 2. Clasp. Hair clipper. Shearing clippers. Hair clipping machine. Clock case. Electric clock. Clutch. Articles coated with metallic alloys. Coffee flask. Coin controlled apparatus. Coke oven. Mineral color 3. Building column. Combination lock. Concrete block with expanded metal reinforcement. Converter. Conveyor trough. Corn cooking machine. Cover for cans, &c. Centrifugal creamer 2. Crematory furnace. Heating kit for curling irons, &c. Cycle driving and steering action.

DAutomatic delineating machine. Coin controlled machine for throwing dice. Dish cleaner. Disinfectant. Display case. Display hook. Ditching machine. Jail door bolt. Door check. Door hanger. Sliding door lock. Door plate holder. Door sealer 2. Sliding door. Draft equalizer. Dredge foot. Drill jar. Holdfast for drilling or boring machines. Dust collector. Blue black dye. Crimson azo dye. Apparatus for dyeing, &c. Dyeing apparatus.

ECombined ear piercer and ring. Electric circuit controller. Transmission of rapidly alternating electric currents. Electric generator. Electric indicator. Dynamo electric machine regulator. Electric motor. Electric switch. Electrical connection 2. Electro hydrocarbon engine. Elevator indicator 2. Endograph. Steam engine indicator. Journal bearing for the gun box rolls of envelope machines. Blackboard eraser. Exercising machine.

Fare register. Frictional feed and driving mechanism. Fence 2. Pliers for building wire fences. Softening fibrous sheets. Letter and bill file. Paper file. Filter 3. Oil filter. Filtering machinery. Apparatus for filtering water, &c. Fire escape. Automatic fire kindler. Fire plug. Flour bolt. Steam boiler line cleaner. Fly screen. Fly trap. Staple forceps. Freezer. Freight transferring device. Fruit drier.

Game apparatus 2. Game board 3. Garbage receptacle. Combination garment. Garment supporting clasp. Gas heater and germ destroyer. Gas heating apparatus. Diaphragm gas meter. Machine for generating beveled gear teeth. Glass crimping machine. Cut off governor. Grinding and polishing machine. Grinding and polishing material. Gun barrel pistol attachment. Recoil check for wheeled gun carriages.

Hame staple. Boring and manufacturing hams. Combined sulky, harrow and cultivator. Corn harvester 2. Frame structure for self-binding harvesters. Grain conveying device for self-binding harvesters. Hat pin. Hawser and anchor chain fair leader. Hay loader. Hay rake and loader. Heater. Heating apparatus. Heel nailing machine. Machine for working hides or skins. Hinge for rules and protractors. Automatic hinge for school seats. Hoisting block. Hoisting machine. Differential hoisting tackle. Vehicle holdback 2. Hoof trimmer. Artificial frog for horses' feet. Device for preventing horses from running away. Horseshoe nail clincher. Manufacturing horseshoes of aluminum. Hose coupling. Hose snapper. Hot water heater. Hub band. Hydrocarbon burner.

ICombine ice cream mold and cutter. Ice grooving machine. Indicator lock. Insect powder distributor 2. Insole. Section insulator.

Jack 2. Roller journal bearing.

KCombination kitchen tool. Knife protector. Knitting machine.

Lace fastener. Machine for automatically feeding lacing hooks to setting devices. Extension ladder and truck. Fire ladder. Sectional ladder. Gas lamp. Bicycle lantern. Latching machine 2. Latch. Metallic lathing. Letter elevator. Lifting jack. Regulator for continuous current arc light circuits. Linoleum cutting apparatus. Electric locomotive. Electric locomotive for elevated tracks. Locomotive tender box lid. Log hauling locomotive. Loom batten. Loom for weaving pile and other figured fabrics. Loom harness evener mechanism. Loom Jacquard mechanism. Loom pile wire. Low pressure alarm.

Mail marking machine. Match splint coiling or winding machine. Matrix moulding and drying apparatus. Mattress former and press. Mechanical movement. Medical case. Tubular metal post. Apparatus for drawing metal tubes. Uniting metallic

sheets. Middlings purifier. Milk can. Mining drill. Mitering machine. Air moistening and ventilating apparatus. Mold. Lawn mower attachment. Mowing machine. Match splint cutting machine.

Nail set. Extracting nickel from its oxides. Nut locking device. Self locking nut. Nut wrench.

OApparatus for atomizing petroleum oil for vapor fuel. Ore pulverizer, gold saver and mineral concentrator. Cleaning and amalgamating ores. Method of and apparatus for the treatment of ores. Process of and apparatus for roasting ores.

Partition, plaster boards. Piano. Piano mute. Piano-forte action. Pipe coupling, lead. Pipe hanger. Pipe testing apparatus, gas. Pipes, covering wire, &c., apparatus for manufacturing. Plane, bench. Plane, rabbeting. Planter or fertilizer distributor, seed. Paper box. Paper cutting machines. Paper, wrapping or toilet. Parchment fabrics, making vegetable. Planter, seed. Plastic compound and making same. Plating metallic surfaces with silver, composition of matter for. Pliers. Pneumatic brake. Pocket book and satchel lock, combined. Power, electrical transmission of. Precious metals out of their solutions, precipitating. Press. Printing machinery, apparatus for cleaning the forms of rotary. Propeller, buoyant screw. Propeller rail, canal boat. Propeller, steering. Propelling apparatus. Propelling device 2. Pulley blocks, convertible bearing for screw. Pump and faucet, beer. Pump, oil can. Pumping engine. Push button. Puzzle 2.

Quartz mill.

Radiator 2. Radiator loops, machine for milling and tapping. Radiator, steam. Rail brake. Railway frog. Railway signal, electrically controlled 3. Railway signaling, interlocking lever for. Railway special work, street. Railway switch, interlocking. Railway weed mower. Raisin seeder. Razor, safety. Refrigerating apparatus 2. Road making and repairing machine. Roads, streets, &c., and blocks therefor, constructing. Rock drill. Rock drill tripod. Rolling mills, automatic stop for. Roofing 2. Rope hauling machine. Rotary engine. Roundabout.

Saccharine solutions, purification and decoloration of. Safe. Saw mill, band. Saw mill dog. Saw mill, variable frictional feed for. Scale, automatic weighing. Scale, letter weighing. Scale, platform. Scriber, curve. Screw head slotter. Screw making machines 2. Seams upon metal sheets, tools for forming lock. Seat. Secondary battery. Seeder. Sewing looped fabrics, machine for. Sewing machine. Sewing machine fabric folding attachment. Sewing machine presser foot mechanism. Sewing machine thread gripping device. Shingle, metal roofing. Shovel. Sieve scalper. Slat fastener. Slate dressing machine. Sled. Sleigh. Smoke abating furnace. Smoke conveyer. Smoothing and pressing iron. Snow guard 2. Soda water, fountain for the distribution of. Soldering iron, self heating. Spark arrester and ejector, combined. Spinning fibrous materials, apparatus for. Sprinkler. Square, self registering try. Stamping and punching machine. Station indicator. Stay, dress. Stay pocket, dress. Steam engine 3. Steam trap. Stock rake. Stone crusher. Stone cutting saw. Stone setting band. Stool, milking. Storage battery system of distribution 2. Stove lid or cover mold. Stove or heater, gas. Strainer. Street sweeper. Sugar, manufacturing. (Surgical), appliance for treatment of the uterus. Suspending device 2. Switch stand and switch operating mechanism. Syringe.

Tablet for physicians, &c. Tags, cards, &c., device for counting and separating. Telegraph key, self closing. Telephone exchange system 2. Telephone registering apparatus. Telephone transmitter. Telephone and telegraphic transmission, composite. Tetrantio anthrachryson. Threshing machine. Tie plate. Timepiece escapement. Tin from tin-plate scrap, removing. Tin from tin scrap, &c., removing. Tire, bicycle. Tire for bicycle, pneumatic 3. Tire, rubber. Tobacco cutter. Tobacco, machine for making plug. Tooth powder box. Transom lifter. Transplanter. Trap. Triturating and emulsifying machine. Trolley. Trolley catcher. Trolley mechanism for electrically propelled vehicles. Trolley wire support. Trolley wire switch, overhead. Trainers. Truck 2. Tunnels, method of and apparatus for driving. Turret tool machine. Typewriter copy holder. Typewriting machine 2.

Valve gear, steam engine. Valve, hydraulic pressure reducing. Valve mechanism for compound engines. Valve mechanism for water heaters, automatic gas. Valve, triple. Valve, machine for reaming and tapping. Vehicle body. Vehicle brake. Vehicle top. Velocipede shaft bearings. Vending apparatus. Veneers and apparatus therefore, manufacture of. Vessels, method and means of closing.

Wagon brake. Wagon seat. Waistband and trousers. Warming machine electric stop motion. Washboard. Washboard. Watch dial. Watch dials, machine for enameling the faces of. Water cooler and refrigerator. Water heater. Water purifier and heater. Water tube boiler. Well apparatus, artesian. Well drilling machine. Wheel making machine. Wheel of fortune, coin controlled. Whiffletree plate. Whip 2. Wick trimmer. Wind engine. Wind wheel. Wiper and oiler for piston and brake rods. Wire covering machine. Wire reel. Wood embossing machine. Wood shredding machine. Wrapper holder. Wrench.

Yoke, neck.

List of Patents Issued January 9, 1894.

AMachine for attaching address labels. Refining asphalt 2. Auger handle. Post hole auger. Automatic lubricator. Awning. Axle cutting machine.

Bale tie machine. Baling press. Parachute sail for balloons. Bandage. Shipping basket. Battery Antifiction bearing. Bell for doors, tables, &c. Bending machine. Bicycle. Support for bicycle seat posts. Bicycle speed gearing. Bicycle stand 2. Means for adjusting the driving chains of safety bicycles, tricycles or other velocipedes. Billiard ball. Boiler covering. Steam boiler furnace. Device for cutting boiler tubes.

Boot or shoe. Bottle, &c. Bottle shaping implement. Bottle stopper. Machine for wiring corks in bottles. Bottling machine. Box fastener. Box for cigars or other articles. Convertible box or coop. Apparatus for drying brewers' grains. Brick kiln. Broom holder. Brush. Buttonhole cutter.

Camera shutter. Can fixing mechanism. Canning machinery. Combined car and pipe coupling. Car brake 2. Railway car brake beam. Car coupling 8. Card door fastener. Railway car draw bar. Car loader. Car safety stop. Car sand box. Railway car seat. Tank car. Vestibule car. Metallic draft sill for cars. Carding machine feeding device. Rubbing apron for carding machines. Carpet stretcher. Carpet stretcher and tacker. Carriage jump seat. Motor driven cash register and check printer. Cash register, indicator and recorder 2. Cattle guard. Combined chair stand and easel. Chest hanging. Chimney. Sectional ventilating chimney. Bath check. Churn 2. Cloth pressing machine. Clutch. Stop cock. Device for blowing out sparks on commutators of dynamos. Compound engine. Concrete mixing mill. Conveying apparatus. Steam cooker. Device for carrying off odors from cooking vessels. Copying press. Machine for making foundries' cores. Corn cutting and shocking machine. Corn husker 2. Combined beater and carder for cotton gins. Crank pin. Cross head. Cultivator. Cultivator or plow guide. Cultivator tooth. Pulverizing attachment for cultivators. Curling iron.

Die press. Display envelope. Door sealer. Drawing rolls for machines for working fibrous materials. Drier. Drill press. Drilling machine. Portable and variable shafting for drilling machines. Blue dye. Alternating current dynamo. Connection between separately excited dynamos and their exciters.

Electric cut out. Spark regulator for dynamo electric machines. Electric switch. Electrical transformer or converter. Secondary battery electrode. Electrolytic apparatus. Electrolytic diaphragm. Machine for making combined envelopes and note sheets.

Fan. Fanning mill. Metallic fastener 2. Feed mechanism. Feed trough. Feed water heater. Metallic fence post. Grip wire fence tool. File. Strainer for granular filter beds. Filter strainer. Fire alarm attachment. Fire escape. Automatic chemical fire extinguisher. Apparatus for mixing flour of different grades. Fluid tank. Folding seat. Fruit jar. Fruit or berry box. Furnace for heating or working metals electrically.

Game apparatus 2. Chasing game. Parlor game table. Garment supporter. Clock mechanism for operating gas cocks. Gas manufacturing apparatus. Gate. Multiple gearing. Glass furnace. Treating gold and silver ores. Engine governor. Grain spout swivel support. Manufacture of artificial granite and veneering stone. Grate 2. Tool grinder. Securing gun barrels to stocks. Recoil operated gun.

Halter. Hammock holder. Beet harvester. Corn harvester 2. Elevator hatchway. Bay press. Water heating apparatus. Histological case. Hoisting mechanism. Horse cover fastening. Horseshoe fastening. Hub attaching device. Vehicle hub. Hulling machine.

Ice creeper. Igniting device for gas or lamp burners. Incubator. Ink fountain. Self feeding inkstand. Insulated conductor. Folding ironing table.

Jack for supporting or bracing excavators, &c. Jeweling tool. Jockey plate. Journal bearing lubricator.

Key fastener. Kiln for baking earthenware. Kitchen table. Knitting machine stop motion.

LScuttle ladder. Double carbon arc lamp. Duplex arc lamp. Electric arc lamp 2. Electric incandescent lamp 3. Lamp shade. Incandescent lamp socket. Lard cooler. Lathe attachment. Lathe tool for turning and finishing gas fittings, &c. Turning lathe. House letter box. Producing illuminated letters. Liquid agitating and discharging apparatus. Lister, cultivator, and planter. Locomotive draw bar. Locomotive or car replacer. Swivel loom 2.

MElectro magnet. Coil for electro magnets. Mail box. Apparatus for the production of malt liquors. Mariner implement. Device for marking off corn rows. Speed and distance measuring and recording apparatus. Meat cutter. Metal capping head. Machine for milling and tapping metal. Metronome. Milling cutter. Mixing machine. Mold. Monument. Mop. Mop head. Mordanting fabrics. Motor. Wind musical instrument.

Oil can. Treating ores. Organ. Baker's oven. Overhead switch. Apparatus for producing ozone by electricity.

PKnockdown adjustable packing case. Piston rod packing. Painting surfaces. Panoramic roll holder camera. Apparatus for drying printed or varnished paper. Machine for making paper box blanks. Paper drying apparatus. Wire cloth for paper machines. Pavement 4. Peanut sheller and separator. Pedal crank. Pen. Fountain pen. Holder for pens, brushes, &c. Permutation pencil. Background carrier for photographers. Photographic camera shutter 2. Pipe coupling. Rotary cylinder planer. Planter. Corn planter 2. Potato planter. Plow. Plow holder attachment. Pneumatic jack. Pocket book. Portable motor. Potato digger. Printing machine. Propeller wheel. Hydraulic propulsion of vessels. Pulverizing machine. Pump 2. Pump attachment for windmills. Compressor pump. Hydraulic air pump. Measuring pump. Puzzle or solitaire game.

Quarrying tool.

Rail joint. Railway, closed conduit. Railway cross tie. Railway crossing, automatic. Railway crossing, street. Railway current collector, electric. Railway rails in paved streets, laying. Railway signal 2. Railway signaling apparatus, electric. Razor. Reflector for electric lamps. Relay. Rolling mills, bar piling mechanism for. Roof covering and manufacture thereof, waterproof. Rope, jumping. Roundabout, observation.

Sash and blind fastener. Sash and screen, combined balanced window. Sash fastener 4. Saw jointer. Sawmill dog, duplex. Saw mitering device. Sawing machine. Scissors. Screws and separating them from

turnings, apparatus for sorting. Seal. Seal lock. Secondary battery. Sewing machine shuttle. Shafting, stop mechanism for. Shafts, securing crank arms to. Sheet metal working machine. Ship's log. American district electric, signal apparatus. Skate sharpening device. Sliding gate. Smokestacks or chimneys, apparatus for producing draft in. Snow melting apparatus. Soap powder, &c., package for. Soil working machine. Spectacle lenses, grinding. Sprinkler 2. Square, folding. Stable or harness room cabinet. Stamp, time and dating. Staple inserting and clinching machine. Starching apparatus, clothes. Steam engine. Steam or baking pan. Steam trap. Stone dressing machine. Stove, oil. Stove or furnace magazine. Stoves, gas heating attachment for solid fuel. Snow burning boiler. Straw stacker. Street sweeper.

Tackles, automatic locking device for. Tag, marking. Telegraph, printing. Telephone call recorder. Telephone switchboards, apparatus for 2. Telephones, time indicator attachment for. Thill support 2. Ticket, railway transfer. Tiles, laying. Time recorder, workman's. Tire, pneumatic 2. Tire riveting machine, wheel. Tire setter. Tires, valve for pneumatic. Toboggan slide, reversible. Tool for handling small metallic articles. Tooth or bone cutter. Toy, dancing. Transom lifter. Tricycle. Trolley cut, out. Tumbling barrel. Type, holder plate for. Type writing machine. Type writing machines, ribbon reversing mechanism for.

Urinal.

Valve, automatic air. Valve controller, electric. Valve for compressor and blowing engines. Valve operating mechanism. Vault cover, ventilating and illuminating. Vehicle, electrically propelled. Vehicle spring 2. Velocipede pedal. Vise, bench. Voltaic cells, depolarizer for.

Wagon, hunting. Wardrobe. Washboard. Washing machine 2. Watch. Watchmaker's lathes, wheel cutting fixture for. Watch protector. Water meter, proportional. Weather strip machine. Welding metal, apparatus for electrically. Wheel 2. Windmill. Windmill regulator. Wine press. Wire gripping and stretching tool. Wire stretcher. Wrench. Zinc, preparing solutions carrying salts of. Zinc, producing metallic.

List of Patents Issued January 16, 1894.

Abdominal supporter. Portable advertising device. Air-cooling apparatus. Apparatus for heating compressed air for power purposes. Ale-drawing device. Making alkali salts. Manufacturing aluminum 2. Making aluminum compounds. Amalgamator. Ale box. Car axle dust guard and oil saver. Vehicle axle.

Baling press. Band cutter. Barrel. Device for directing hoops on barrels. Bath tub. Making secondary battery plates. Folding bed. Bedclothes fastener. Folding bedstead. Belt tightener and shifter. Bicycle lock. Bicycle saddle. Blasting rock. Centrifugal blower. Automatic boiler feed. Boiler feeding apparatus. Sham bolster frame. Combined book and index. Indexed book. Book mark. Book stapling machine. Bottle protector. Stopper for bottles, jars, &c. Buttonhole bouquet holder. Box fastening. Brick kiln. Brick kiln furnace. Machine for making bridle bits. Broom or brush. Broom rest. Bungalow.

CSecret compartment for cabinets, &c. Cable grip. Combined cane and camera tripod. Apparatus for filling cans and cooking the contents thereof. Apparatus for plugging and topping tomatoes, &c., in cans. Direct bail attachment for cans. Means for transmitting power from car axles. Car body bolster. Car brake handle. Railway car brake. Car construction. Car coupling. Car draw bar. Railway car draw gear. Freight car. Street car signal light. Cable car transfer device. Car wheel. Pattern for making car wheels. Road cart. Cash register. Cash register, indicator, and check printer. Furniture caster. Forming molds for casting car wheels. Mold for casting metals. Pivoted catch. Chain making machine. Treating checks to prevent fraudulent alteration thereof. Chimney cap. Portable fireproof chimney. Chimney dasher. Clapboard or siding strip for houses. Plow clevis. Alarm clock. Pinless clothes line. Clutch 3. Apparatus for handling coal in bulk. Stop cock. Coffee pot percolator. Coin separator and deliverer. Collar fastener. Commutator and connection for dynamos. Apparatus for ejecting core barrels. Corset. Cotton press. Crank arm fastening. Shipping crate. Cultivator. Cultivator trip device. Automatic rain water cut off and filter. Cyclometer.

DPreparing decorating mixtures. Inflatable decoy. Coin or check controlled delivery apparatus. Dental forceps. Dental mold for teeth. Dish cleaner. Rack for displaying samples of paint. Sliding door lock. Draft equalizer. Dredge boom. Dredging or excavating apparatus. Dress hook. Dust cloth holder or picture hanger. Dyeing apparatus 2.

Ear ring. Device for transferring earth, ores, and &c. Continuous electric current distributing system. Electric heater. Dynamo electric machine or motor. Automatic regulator for dynamo electric machines. Electric search light. Electric switch. Automatic electro magnetic switch. Elevator controlling device. Elevator gate operating device. Embroidery hoop holder. Engraving machine. Envelope. Excavating bucket. Excavating or dredging bucket.

Fabric treating apparatus. Ceiling fan motor. Self adjusting feed mechanism. Feed water heater. Combined feed water heater and receiver. Automatic feed water regulator. Fence. Hand fence machine. Wire fence. Twisting tool for fence wire. Fertilizer distributing feed. Fiber separating machine. Vehicle fifth wheel. Filter. Finger ring. Fire escape. Portable fire escape. Fire extinguisher. Automatic fire extinguisher for oil rooms. Fish hook guard. Fishing tackle case. Fork. Friction wheel. Fruit box or crate. Furnace grate. Furniture clamp.

GApparatus for the manufacture of gas. Oil gas burner. Gas forcing plant. Gear for driving small machines. Gill box conductor or funnel. Glass melting furnace 2. Gold separator. Grain binder knotter. Grain drill. Sickle grinder. Grinding mill. Pocket guide and compass.

Hair trimming shears. Harrow. Corn harvester 2. Hat fastening device. Hay loader. Heating apparatus, hot water. Hides, apparatus for electrolyti-

POPULAR SCIENTIFIC BOOKS.

The A B C of Electricity, by W. H. Meadowcroft. Dynamo and Electric Motors, illustrated, by Trevert. Practical Treatise on Electro-plating, by Sam. Practical Treatise on the Incandescent Lamp, by Randall. Alternate Current Machinery, by Gilbert Kapp. Steam Boiler Explosions, by Zerah Colburn. Ventilation of Buildings, by W. F. Butler; edited and enlarged by J. L. Greenleaf. On the Designing and Construction of Storage Reservoirs, by Arthur Jacob, A. B. A Treatise on the Compound Engine, by John Turnbull, Jr.; with additions by Prof. S. W. Robinson. Safety Valves, by Richard H. Buel, C. E. A Practical Treatise on the Teeth of Wheels with the Theory of the use of Robinson's Odontograph, by Prof. S. W. Robinson. On Transmission of Power by Wire Ropes, by Albert W. Stahl. Terrestrial Magnetism of Iron Ships, by Prof. Fairman Rogers. Cable Making for Suspension Bridges, as exemplified in the construction of the East River Bridge, by Wilhelm Hildenbrand, C. E. A Hand-book of the Electro-magnetic Telegraph, by A. E. Loring, a Practical Telegrapher. Transmission of Power by Compressed Air, by Robert Zinner, M. E. Turbine Wheels, by Prof. W. P. Trowbridge. The Telescope: its Construction, etc., by Thomas Nolan. Induction Coils: How Made and How Used. The Theory of the Gas Engine, by Dugald Clerk. Electro-magnets, by Th. du Moncel. Dynamo-electric Machinery, by S. P. Thompson. Dynamo Electricity, by John Hopkinson, F. R. S. A. Schoolbred and R. E. Day. Recent Progress in Dynamo-electric Machines, being a Supplement to Dynamo-Electric Machinery, by Prof. Silvanus P. Thompson. The Steam Engine Indicator and its Use, by W. B. Levan. Hand-book of Mineralogy; Determination and Description of Minerals found in the United States, by Prof. J. C. Foye. Modern Gun Cotton: Its Manufacture, Properties and Analysis, by Lt. John P. Wisser, U. S. A.

cally treating raw hides. Hinge Horseshoe. Hot water circulating apparatus. Hulling coffee or for other purposes, machine for 2.

Inhaler, electric. Insulator, trolley wire. Iron plate pickling apparatus. Ironing table folding frame. Jail grate. Journal bearings, adjusting device for. Journal boxes, means for setting up.

Key setting machine. Kitchen cabinet. Knit garment.

Ladder, folding. Lamp, electric arc. Lamps, means for adjusting electric. Lamps, suspension ring for harps for hanging. Lath, sheathing. Lath dog. Leak stopper. Leather shaving machine. Letters, manufacture of sign. Life buoy, marine. Life saving device for tramways. Linotype and holder therefor, curved. Loading wagons with gravel, sand, &c., apparatus for. Locks, automatic locking mechanism for permutation. Loom wire heddle.

Magnets, machine for winding electro. Mail bag crane. Mail box. Mash machine. Match box holder. Measuring vessel. Meats, preserving. Mechanical motor. Mechanical movement. Milking machine, cow. Mop wringer 2. Motor generator. Mowing machine cutter bar. Muller for grinding or amalgamating mills.

Needle blank grooving and punching machine. Nut cracker and pick.

Oil extractor. Oil, fuel. Oiling device, trolley. Ordnance breech mechanism. Ordnance sight. Ore concentrator or mineral saving machine. Ornament for picture, mirror, or other frames.

Packing valve stems. Padlock, permutation 2. Paper hobbin. Paper folder. Paper waxing or coating machine. Parcel or book carrier. Pen fountain attachment. Pencil, magazine lead. Phosphate rock, apparatus for treating. Photographic plate holder. Pickling tank. Piston rods electrically, apparatus to control the strokes of. Planer, sliding. Planter and distributor. Planter, check row corn. Flow. Pneumatic elevator. Polypantograph 2. Precipitates, vessels for collecting. Presses, means for pressure limiting in. Pressure gage register. Printers' plates, machine for trimming. Proof press, printers'. Propeller wheel. Pug mill mixer. Pulley block. Pulp compressing machine. Pump, fluid. Pump for water systems. Pump, hydraulic air. Pump, sinking. Pump, vacuum. Punching machines, &c., apparatus for feeding plates or bars to. Putting tool.

Rack. Rail bending press. Rail joint 3. Rail joint or coupling. Railway battery system, electric. Railway signal. Railway switch. Railway track. Railway track jack. Railway track lifter, adjustable. Railway tracks, preventing the creeping of rails on. Railway trolley, electric 2. Railways, rail bond connector for electric. Respirator holding ring. Rings, manufacturing ornamented. Rope catch, fire escape, and climbing apparatus, automatic. Rope, skipping. Rotary engine. Roundabout.

Sash fastener. Sawing machine, wood. Screw cutting die. Screws, manufacture of. Seamless figured fabric. Secondary battery. Sectional boiler. Seed cleaner. Sewing machine. Sewing machine, shoe. Sewing machine trimmer. Shade forming and cutting die. Shell bracket. Shoe and making same. Sieves, transporter for flat. Signaling system, fluid pressure. Sinks, outlet connection for steel. Slag, apparatus for removing. Smoke consumer 2. Soda water dispensing apparatus. Speed indicator for shafting. Sprocket wheel. Stacking frame. Stamp, time. Steam to boilers and heating feed water, apparatus for returning exhaust. Stove. Street sweeper. Sucker rod elevator and wrench. Sulky. (Surgical), device for rectifying the uterus. Switchboard.

Table leg fastening. Tanning apparatus. Teeth separator. Telegraph, sextuplex. Tent Thill coupling 2. Ticket, railway mileage. Time interval clamp or brake, electrical limiting. Tire, pneumatic. Tobacco box clamping machine. Toe weight. Tongue support. Tool handle. Tool holder. Tooth crown, artificial 2. Track sanding apparatus. Truck, car. Truck, hand. Trunk, combination. Tubular and sectional boiler. Type, binder or tie up for pages of.

Umbrella cover, detachable 3.

Vacuum apparatus. Valve, automatic balanced steam regulating. Valve gear. Valve, hydraulic elevator. Valves for air brake hose couplings, device for opening or closing. Vehicle. Vehicle running gear. Vehicle, two wheeled. Velocipede, ice. Velocipedepedal. Velocipede, treadle 3. Vending machine for stamps and envelopes. Voltaic cells, excitant for. Voting machine 2.

Washing machine 4. Watchcase pendant and bow fastener. Watchmaker's tool. Water closet seat. Water meter, compound intermittent. Wheel rim and tire. Whiffletree 2. Wick lifter. Wind or current operated wheel. Wind wheel. Winding yarn, machinery or apparatus for. Wire brushes, method of and machine for making. Wire reel. Wire tension device, sphere, and stretcher, combined. Woodworking machine. Wrench.

Yoke center, neck.

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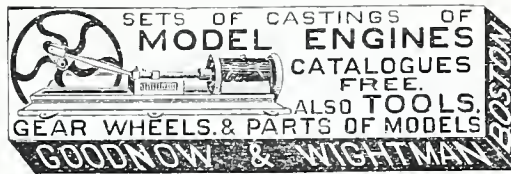


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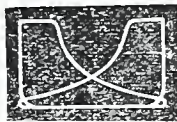
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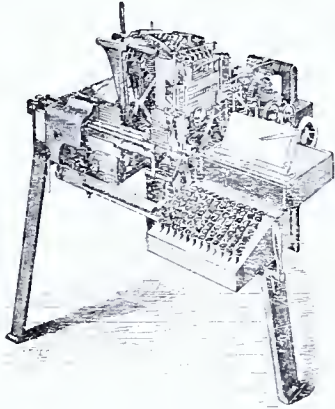
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Winter and Spring stock now on hand to select from.

PRICES REASONABLE.



The World's Columbian Commission,

AT THE

INTERNATIONAL EXHIBITION, CHICAGO, 1893.

DECREED TO THE

Monoline Composing Company,

WASHINGTON, D. C.,

A DIPLOMA and MEDAL for SUPERIORITY of Its COMPOSING MACHINE upon the Certificate of a Board of International Judges for the following characteristics of SUPERIOR MERIT.

OFFICIAL COPY OF AWARD TO THE MONOLINE:

Keyboard similar to typewriter, controlling series of stops and actuating assembling mechanism. Simple, improved and efficient casting and line-trimming devices.

Novel and unique matrix bars, having parallel sides and containing each a series of intaglios, with hook-shaped ends to engage positively and accurately operating distributing mechanism, consisting of a series of rigid rods, which automatically drop and lift matrix bars to magazine.

Application of the simplest, smaller number, most efficient, easily controlled and automatically operating mechanisms to assemble intaglio type characters and cast metal bars with type faces in relief thereon from which to print.

Locking attachment to positively prevent actuation of character keys when line has become filled or mechanisms of machine fail to perform their proper function.

Simple, effective and accurate method of distribution.

Desirable plan of interchangeable keyboard to accommodate machine to operators familiar with manipulation of modern typewriters.

Advantage of casting any number of type bars in succession from a single assembled line without affecting keyboard or assembling mechanism.

Deep relief between words and sentences and at ends of paragraphs, in finished product, highly advantageous, positively obviating necessity of hand relief work in stereotyping process.

Marked rapidity with which matrix bars can be removed from machine and replaced by others to give different face and size of body to finished product.

Speed of machine beyond ability of operator to actuate proper character keys required to correctly form sentences.

Machine compact in design, well constructed, easily operated at expense of minimum power, with efficiency of performance measured at eight thousand ems of composed type per hour.

Attest: A. S. CAPEHART,

Individual Judge.

Approved: W. A. JAMES,

Vice-President Departmental Committee.

Approved: JOHN BOYD THACHER,

Chairman Executive Committee on Awards.

Barnes Friction Clutch and Cut-off Coupling.

It is not necessary to dwell upon the advantages of friction clutches and cut-off couplings for connecting and disconnecting counter shafting with engines, water-wheels, dynamos, electric motors, etc. The design of this article is to direct attention to the special value of the appliances for this work that have been so successfully put upon the market by the J. H. & D. Lake Co., of Massillon, Ohio, formerly of Hornellsville, N. Y. The removal to Massillon gave the company much increased facilities, and by the addition of a large amount of improved machinery, a capacity has been secured more nearly adequate to the demand which the excellence of their devices and their liberal policy of trade extension have built up. The daily capacity of the foundry at Massillon is twenty tons. The works are lighted throughout by incandescent lamps, and in all their equipment

are a pattern of completeness.

The specialties of the J. H. & D. Lake Co. are the Barnes patent screw-lever friction-clutch pulley and the Barnes patent screw-lever friction clutch cut-off coupling, both of which are illustrated on this page. Simplicity and strength are the two claims which the manufacturers emphasize. The clutch pulley has positive grip and absolute release; it is adapted to light or heavy work and operates quickly, starting and stopping machinery easily without shock or jar. Fig. 1 is a sectional side view of the Barnes friction clutch pulley in the position it assumes when released and shows the driving hub keyed to the shaft. A perspective view is given in Fig. 2. A sectional end view, Fig. 3, shows the friction-hub encircled by the friction-ring, the former being cast in one solid piece with the pulley. The projecting lugs, on the opposite side of the driving hub of the ring, drop into the lug cavities of the friction ring, and when the clutch is on these lugs take all the driving power. Fig. 4 represents the operating lever

attached to the slipper-sleeve in operating position.

Figs. 5 and 6 show respectively a sectional side view and perspective view of the Barnes single-lever or multiband friction-clutch pulley; which is claimed to be very efficient for light or countershaft work, and Fig. 7 shows sectional view of cut-off coupling. The friction-ring of this clutch is merely a spiral band which closes by traction pressure at the ends. In operation, to obtain the power the slipper-spool on the shaft is forced under the cam lever, the wedge-fulcrum end of which comes between the cylinder and the wedge-shaped projection of one end of the friction-ring, the other end of the ring resting against an adjusting set-screw which gauges the pressure of the friction-ring.

In spite of the general depression the J. H. & D. Lake Co. have accumulated a goodly number of orders, and if the improved conditions noted in many quarters continue, the prospects are that their business through the winter and spring will reach a very satisfactory volume.

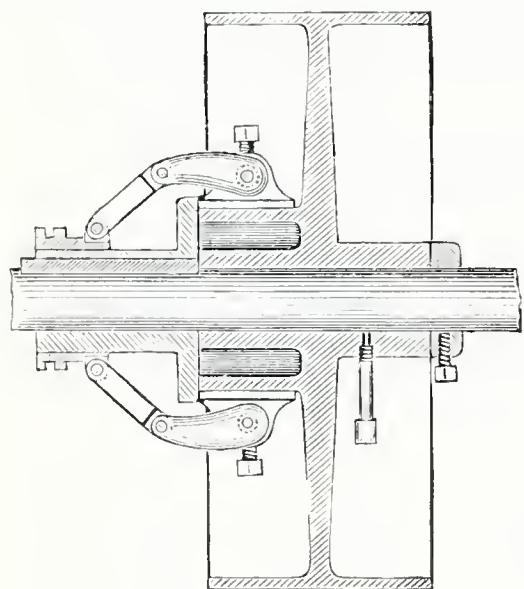


Fig. 1.

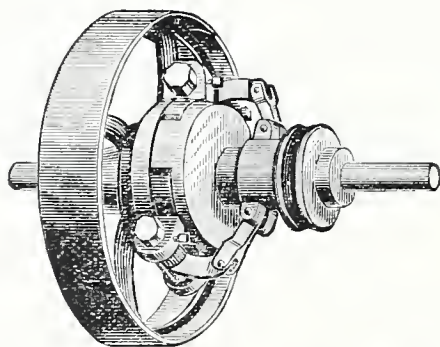


Fig. 2.

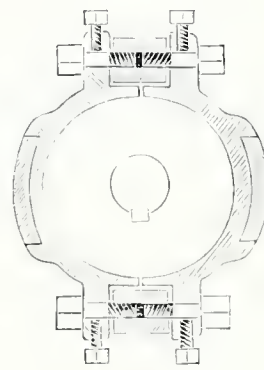


Fig. 3.

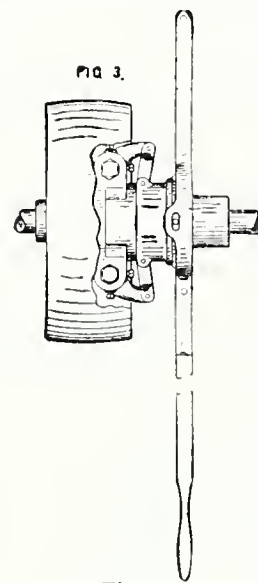


Fig. 4.

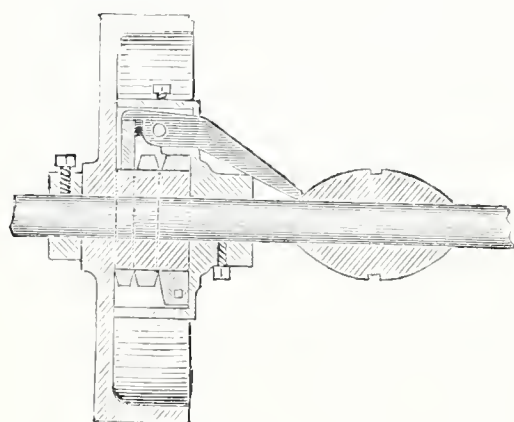


Fig. 5.

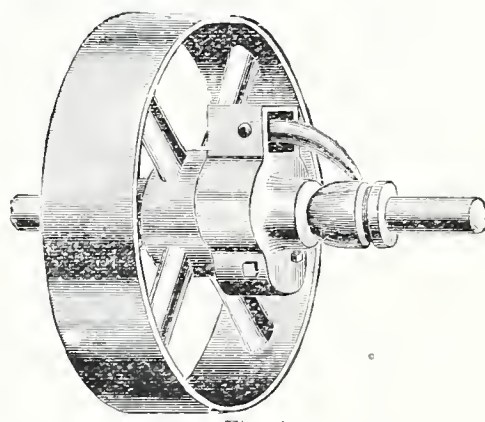


Fig. 6.

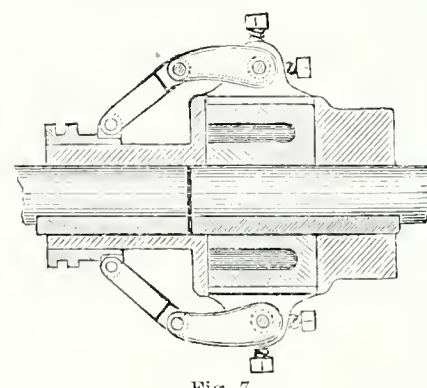


Fig. 7.

Practical Indorsements.

The John H. McGowan Company.

Cincinnati, O., Dec. 20, 1893.
J. H. & D. Lake Co.,
Massillon, Ohio.

Gentlemen: Am in receipt of your letter of inquiry of the 18th inst., as to our opinion of the merits of your Friction Clutch Pulleys that we have in use. In reply to same, would say that we are very much pleased with them and cheerfully recommend them as being first-class.

Yours truly,

The John H. McGowan Co.,
John W. Neil,
Secretary.

Wheelersburg Drain Tile Co.

Wheelersburg, Sciota, Co. Ohio,
Dec. 26, 1893.

Messrs. J. H. & D. Lake,
Massillon, O.

Gentlemen: I have had one of your friction clutch pulleys in use the past year, and although I have handled machinery all my life, I find it the best friction clutch I have ever used. Before using your clutch

I was greatly annoyed by loose pulleys wearing my belts. By the use of one a man or boy can start or stop my machinery. It has easily paid for itself in one month's run, and it is with great pleasure that I recommend it.

Yours truly,

George A. Bell,
Proprietor of the Wheelersburg Drain Tile Co.

I. B. Coleman

Elmira, N. Y. Dec. 22, 1893.
J. H. & D. Lake Co.,
Massillon, Ohio.

Gentlemen: In reply to your inquiry as to how we are pleased with the Cut-off Coupling of your manufacture we have on our main line of shafting, we take great pleasure in saying that it is giving the best of satisfaction, in every respect.

Yours truly,

I. B. Coleman.

Witherby, Rugg & Richardson.

Worcester, Mass., Dec. 18, 1893.
J. H. & D. Lake Co.,
Massillon, O.

Gentlemen: Yours of the 15th came duly

to hand asking us how we liked the Friction Pulleys we bought of you last year and in reply we have to say we are very much pleased with them, as they have been in constant use since we received them, and we haven't touched them since putting them up, and we take pleasure in saying if we should have occasion to use more Friction Clutches you will hear from us with orders for the same. Until then we remain,

Yours truly,
Witherby, Rugg & Richardson.

The Springfield Gas Engine Co.

Springfield, Ohio, Dec. 21, 1893.
J. H. & D. Lake Co.,
Massillon, Ohio.

Gentlemen: In reply to your favor of the 18th, we cheerfully comply with your request, and would say that we have been using one of your Screw Lever Friction Clutch Pulleys in our factory for one year, and the same has given us perfect satisfaction. We have also furnished several to our customers, which have also given satisfaction.

Yours truly,
The Springfield Gas Engine Co.,
Per A. S. Rawlings.

The Hendey Machine Co., Machinists' Tools.

Torrington, Conn., Dec. 13, 1893.
J. H. & D. Lake Co.,
Massillon, O.

Gentlemen: In reply to yours of 13th, we would say. We have been using your clutches for the past two years, and we find them very satisfactory. They have never caused us the least trouble.

Yours truly,
The Hendey Machine Co.,
H. J. Hendey, Pr.

The American Illuminating Co.

Hornellsville, N. Y., Dec. 26, 1893.
J. H. & D. Lake Co.,
Massillon, Ohio.

Gentlemen: Replying to your letter of the 15th inst. in regard to the working of your Patent Friction Clutch Pulleys and Cut-off Clutches, I have to say. We have two of your Clutch Pulleys on our shaft running a street railway system where the power varies from one to two hundred horse power. They have been running eighteen months and have given good satisfaction. I consider them first-class in every respect.

Very truly yours,
L. T. Mason, Gen. Manager,

TESTIMONIALS FROM MANUFACTURERS.

Read What a Few of Our Customers Have to Say About our Patent Screw-lever Friction-clutch Pulleys.

The Francis Fritsch Manufacturing Co.

Cincinnati, O., Dec. 16, 1893.
Messrs. J. H. & D. Lake Co.,
Massillon, Ohio.

Dear Sirs: We take great pleasure in saying that we have placed in the last two years not less than 25 of your Screw Lever Friction Clutch Pulleys, clutch couplings and clutches for sprocket and gear wheels of various sizes, and not in one single instance have they given us the least trouble or annoyance.

We have used any number of different friction clutches in the last ten years, and had learned to regard Hub Friction as something that would answer for light power, but where heavy power was required they were found wanting. However, since taking hold of your clutches we have not used any other unless compelled to by specifications made by others. In some cases we obtained consent to apply the Lake, but only under specific guarantees, and in not a single case have we had occasion to replace one or had even a complaint. The adjustment is so simple that the most inexperienced are capable of making it without any danger of throwing them out of balance, or gripping unequally; a difficulty so frequently encountered with others. Please hurry forward the orders you now have.

Yours truly,
The Francis Fritsch Mfg. Co.,
John G. Fritsch,
President.

John Steptoe & Co.

Cincinnati, Ohio, Dec. 14, 1893.
Messrs. J. H. & D. Lake,
Massillon, O.

Gentlemen: We take pleasure in saying that the Friction Clutch Pulleys furnished us for use on the counter-shafts of our Sharpers are satisfactory in every respect. We consider them far superior to any we have ever used.

Yours respectfully,
John Steptoe & Co.

Coe & Wilkes.

Painesville, O. Dec. 23, 1893.
J. H. & D. Lake.
Massillon, Ohio.

Gentlemen: Having used over fifty of your Friction Clutch Pulleys in a variety of sizes we are pleased to recommend them as well proportioned, strong, simple, durable and very efficient.

Yours truly,
Coe & Wilkes.

William Richardson.

Hornellsville, N. Y. Dec. 22, 1893.
J. H. & D. Lake Co.,
Massillon, Ohio.

Gentlemen: We have two of your Patent Screw Lever Friction Clutch Pulleys in our factory, and cheerfully recommend them to any one who is in need of same. They work perfectly.

Respectfully yours,
William Richardson.

J. R. Alsing Company.

New York, Dec. 20, 1893.
Messrs. J. H. & D. Lake,
Massillon, Ohio.

Gentlemen: In answer to your favor of Dec. 18th we will state that we have used some of your Patent Screw Levers, and multiband Friction Clutch Pulleys, and must say that we are thoroughly satisfied in every respect with them.

Yours truly,
J. R. Alsing Company.

The Avery Stamping Co.

Cleveland, Ohio, Dec. 19, 1893.
Messrs. J. H. & D. Lake,
Massillon, Ohio.

Dear Sirs: We have used quite a number of your Friction Clutches on our line shafts, and also on a great many of our presses, and in comparison to other makes of Friction Clutches, of which we have a considerable number in our factory, we would say that we prefer yours as they are quick and positive acting and do not easily get out of repair. We would recommend them to anyone desiring a first class pulley.

Yours respectfully,
The Avery Stamping Co.,
Per Henry W. Avery.

City Machine Co.

Cleveland, Ohio, Dec. 20, 1893.
J. H. & D. Lake Co.,
Massillon, Ohio.

Gentlemen: We have a number of your small Clutches in use and find them to fully sustain your claims for them, and can approve same to any person wishing to know the merits of your Clutch.

Yours truly,
City Machine Co.,
E. J. Kershaw.

The Dayton Malleable Iron Co.

Dayton, Ohio, Dec. 15, 1893.
Messrs. J. H. & D. Lake Co.,
Massillon, Ohio.

Gentlemen: In response to your valuable inquiry of the 14th inst., relative to the merits of the 48-inch Friction Clutch Pulley which you furnished us, beg to say we have had this device in operation for heavy work on our rattlers, for a number of years, and have yet to hear the first complaint of its efficiency or durability. In fact, we are free to admit that it is the best Pulley we have ever been able to obtain for our work.

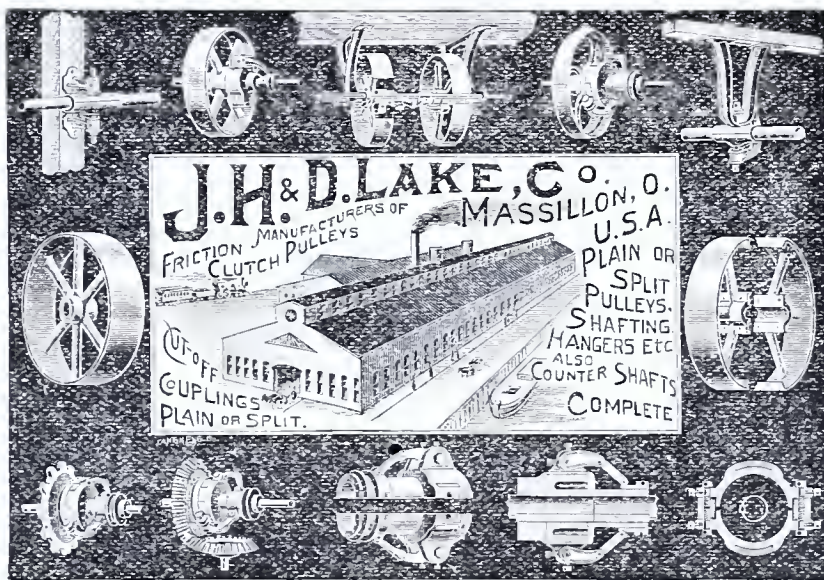
Very truly yours,
The Dayton Malleable Iron Co.,
M. B. Earnshaw,
Secretary.

The Laidlaw, Dunn, Gordon Co.

Hamilton, Ohio, Dec. 16, 1893.
J. H. & D. Lake Co.,
Massillon, Ohio.

Gentlemen: We have had in use for about one year one of your Friction Clutch Pulleys, 48 diameter and 12 face, and the same has worked to our entire satisfaction.

Yours truly,
The Laidlaw, Dunn, Gordon Co.,
Per J. L. Blair.



The Anderson Forging Co.

Anderson, Ind. Dec. 12, 1893.
Messrs. J. H. & D. Lake Co.,
Massillon, Ohio.

Dear Sirs: Yours at hand and noted. We have two of your Friction Clutch Pulleys, and are happy to report that they are all they claim for them, and we shall equip our machinery with more of them as our means will allow.

Yours truly,
The Anderson Forging Co.

N. W. Corkey & Son.

Jamestown, N. Y. Dec. 11, 1893.
Messrs. J. H. & D. Lake,
Massillon, Ohio.

Dear Sir: In reply to your favor of the 8th would say, that so far your Couplings have worked satisfactorily to us.

Very truly yours,
N. W. Corkey & Son.

The Wood Brown Co.

Columbus, Ohio, Dec. 13, 1893.
J. H. & D. Lake Co.,
Massillon, Ohio.

Dear Sirs: Replying to yours of the 8th, would say, we have used your Clutch Pulleys for two years and are well pleased.

We pronounce them the best in the market.

Yours &c.,
The Wood Brown Co.

E. M. Link Machinery Co.

Erie, Pa. Dec. 20, 1893.
Messrs. J. H. & D. Lake Co.,
Massillon, Ohio.

Gentlemen: We are in receipt of your favor of the 9th, and in reply would state that we have in use some of your Friction Clutch Pulleys which we consider equal to any in the market, and have no hesitation in recommending them to any person who wants a first class and reliable Clutch.

Yours very respectfully,
E. M. Link Machinery Co.,
Per Henry N. Link.

The Griffith & Wedge Co.

Zanesville, Ohio, Dec. 11, 1893.
Messrs. J. H. & D. Lake Co.,
Massillon, Ohio.

Gentlemen: The Friction Clutch Pulleys supplied by you have given us the highest satisfaction. In our estimation they are the best now in the market.

Very truly yours,
The Griffith & Wedge Co.

W. E. Caldwell, Co., Millwrights, Machinists, and Mill Furnishers.

Louisville, Ky., Dec. 13, 1893.
J. H. & D. Lake Co.,
Massillon, Ohio.

Gentlemen: It will, no doubt, be of interest to you to learn that your Patent Screw Lever and also your Multiband Friction Clutch Pulleys and cut off couplings which we have placed, are giving entire satisfaction. Out of the twenty-eight or thirty which we already have in use in different factories, we have yet to record one instance wherein there has been any complaint made.

We have, in the last ten years, used and placed one or more of nearly all makes of friction clutches and we are satisfied that these are the best friction clutches now in existence.

Yours very truly,
W. E. Caldwell Co.,
Miller.

Hunter Manufacturing Co.

50 N. Twenty-third St.,
Philadelphia, Dec. 26, 1893.
J. H. & D. Lake Co.,
Massillon, Ohio.

Gentlemen: We purchased from you last March 1893, four of your twelve inch Patent Screw Lever and Multiband Friction Clutch Pulleys, for a very particular and severe place, as they were to run at a very high rate of speed. We were somewhat skeptical at first as to what they would do on so high a speed, as they were to reverse constantly. We are thoroughly satisfied with them and they have been in constant use ever since and have greatly surpassed our expectations and would be pleased to recommend them to any one whom you may refer to us.

Yours truly,
Hunter Mfg Co.,
J. E. Langdon, Manager.

The Lodge & Shipley Machine Tool Co.

Cincinnati, O., Dec., 15, 1893.
J. H. & D. Lake Co.,
Massillon, O.

Gentlemen: We have had several of your clutches in operation for about a year. We consider them excellent; we have had no trouble at all with them and find them easily adjusted. Wishing you every success, we are,

Very respectfully,
Lodge & Shipley Machine Tool Co.,
Murray Shipley, Jr.,
Vice Pres., and Sec'y.

Richmond City Mill Works.

Richmond, Ind., Dec. 23, 1893.
The J. H. & D. Lake Co.,
Massillon, Ohio.

Gentlemen: We have your favor of the 20th inst., note contents. In answer would say, we have used several of your Friction Clutch Couplings, both the screw lever and multi-band pattern. We have found them satisfactory in every particular. We have never used any style of Clutch Couplings that we liked better.

Truly yours,
Richmond City Mill Works,
By H. T. Lemon, Sec.

Star Union Brewing Co.

Peru, Ill., Dec. 22, 1893.
Messrs. J. H. & D. Lake Co.,
Massillon, Ohio.

Dear Sirs: We have two of your Clutch Pulleys in our malt house which are giving the best of satisfaction and we can recommend them to the trade with pleasure.

Respectfully,
Henry Horner, Pres.

FREDERICK CARL,

Successor to E. H. BRADFORD.

Model Maker,**Expert In Perfect Working Models,****711 G Street, opp. U. S. Patent Office.**

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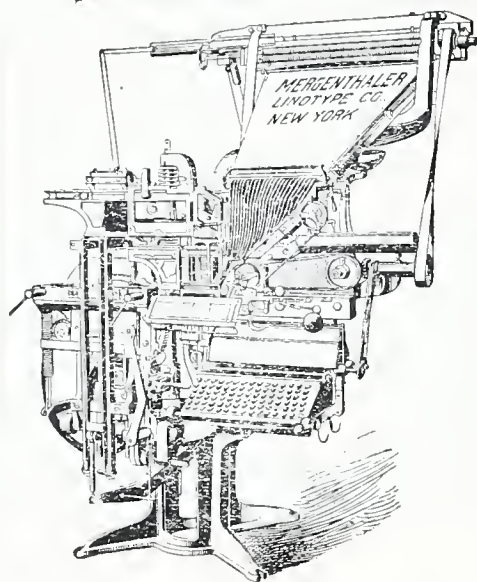
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MAURICE JOYCE,
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AND INDUSTRIAL REVIEW

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Fifth Year. }
No. 3.

WASHINGTON, D. C., MARCH, 1894.

{ Single Copies 10 Cents.
\$1 Per Year.

THE TORPEDO BOAT CUSHING.

One of the Swiftest of Her Class in the World--
Search Lights Fail to Detect Her.

At the last anniversary of the Boston Tea Party, Secretary Herbert said that "out of the throes of the recent great civil conflict were born the swift commerce destroyer, the torpedo boat, the great gun and mighty battle ship of today. The shock of the battle between the Monitor and the Merrimac, in Hampton Roads, resounded around the earth. It kindled the fires in the workshops of Europe. All the naval powers of the world went to work to manufacture armor plate that could not be pierced, then guns that could not be resisted, then torpedoes that vessels could not withstand, and then vessels that could catch and could not be caught."

The swift United States naval cruiser Columbia developed a speed of 22.81 knots per hour in her trial trip. The Cunard steamship *Lucania* recently maintained an average speed of 22.74 knots per hour for one full nautical day. The *Campania* has maintained an average speed of 21.28 knots per hour between New York and Queenstown, which is thought to be the highest average hourly speed ever attained for the entire distance of the trans-Atlantic voyage. In case of war with Great Britain these two ocean flyers would very likely be sent forth to destroy American commerce on the high seas or be employed as transports.

In a race between the cruiser *Columbia* and the *Lucania*, for the capture of the later, the cruiser could gain but .07 of a knot per hour over the speed of the English vessel, and the later could not be overtaken in a trip across the Atlantic, provided the *Lucania* sighted the *Columbia* under favorable circumstances, which would be about 18 miles distant, thus giving the *Lucania* a fraction more than 15 knots start. Under these conditions the English vessel would reach a safe harbor in her own country from almost any point in the Atlantic ocean. The *Lucania* is presumed to be the only ship the *Columbia* could not overtake in a chase across the Atlantic. Conditions being as stated it is believed the *Columbia* would overtake the *Campania* in less than ten and one half hours, figuring on what is now known to be the speed of these two vessels.

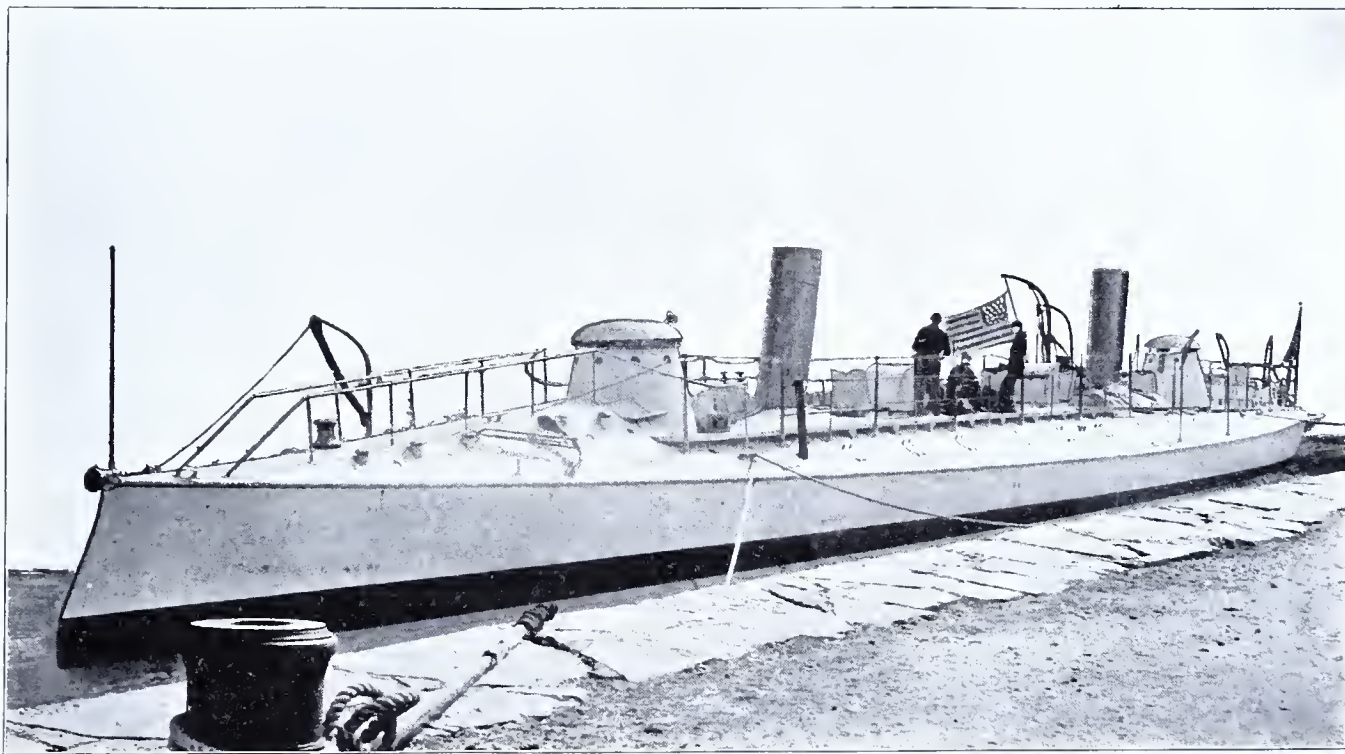
Such would not be the case if the fast flying little *Cushing*, which is now undergoing repairs at the Washington Navy Yard, was an ocean greyhound:

but she is not, although supposed by many persons to be a vessel of great seagoing capacity. The torpedo boat *Cushing* is simply the fastest steam launch ever built by the Herreshoff firm. She is a steel torpedo boat 138 ft. 9 in. long, 14 ft. 10 in. in extreme breadth. Her mean draft is but 5 ft. 3 in., with displacement measured at 116 tons. She carries twin screw engines of the vertical quadruple expansion type. She was built to show at least 22.5 knots per hour. She carries three torpedo tubes and 3 1-pound rapid fire guns, and cost the government something more than \$100,000.

The *Cushing* travels very low on the water and at a maximum speed of 24 or 25 miles an hour, although 27 miles per hour has been rolled off by the little vessel. She was constructed for the purpose of annoying men-of-war and blockade vessels by destroying them with torpedoes. She carries a crew of 20

mined to have the most deadly effect when striking the vessel. When the torpedo assumes the level it is intended to travel upon, it shoots forward at the rate of about 30 knots per hour. The torpedoes can be fired at varying angles, and when the *Cushing* is going as fast as 13 to 15 knots per hour, thus making it almost impossible to injure the torpedo boat by fire from the enemy, even if detected in her deadly work. In practice the gunners of the *Cushing* have succeeded in striking a target the size of an ordinary cruiser a fraction over four times out of five shots fired.

Besides practicing at torpedo firing last summer, the *Cushing* made numerous trips out of the harbor at Goat Island with a view of determining if it was possible to detect her with search lights when coming back to her mooring. She was easily discerned on these nocturnal visits until her color was changed to a dull green, and after this she was never discovered until after she had signalled that she had been prowling about among the big battle ships and could have blown any or all of them out of the water. On several occasions she ran up within a few yards of the *San Francisco* and *Miantinimah*, in the face of their search lights, without being detected. The *Cushing*, as well as all other boats of her class, have a difficulty to meet and overcome in the wire netting that is now used by large vessels to protect themselves from torpedoes. These nets go 20 or more feet into the water and are usually placed at least as far from the sides of



TORPEDO LAUNCH "CUSHING."—FORCED SPEED TWENTY-SEVEN MILES AN HOUR.

men and 40 tons of coal, and her engines have a maximum of 1,720 horse power. She is neither an armored fighting boat nor is she fitted or intended for submarine duty, but is simply considered the greatest torpedo boat of this or any other country. The *Cushing* is painted green and displays scarcely anything above the water when out for action, and is proposed to be most effective at night, when, from experiments made at Newport, last summer, it is almost impossible to find her in the water, even with the large search lights now used by naval vessels. When this little destroyer goes forth for business she approaches to within about 1,000 yards of the vessel to be attacked, when a torpedo is fired out of one of the three tubes she carries. But five ounces of powder is used for this purpose, just enough to clear the projectile from the side of the boat, when, on striking the water, the torpedo sinks to whatever depth the gunner has previously deter-

mined to have the most deadly effect when striking the vessel. They have so far effectually stopped torpedoes. The submarine gun of the *Destroyer*, which was sold to the Brazilian government, would force a torpedo projectile through these nets at a distance of 200 yards, and further experiments may be made in this direction the coming summer.

The style of torpedo used by the *Cushing* cost \$2,500 each. They are long steel casings with a number of cross sections. A charge of high explosives is placed forward. Back of this is the chamber for compressed air which is employed to operate the propelling mechanism. Aft of this the automatic steering and adjusting device is located. These torpedoes are recoverable after being fired, as the exhaust of the pneumatic engine creates bubbles on the water, and the projectile rises to the surface after it has traveled the distance it was previously adjusted to cover. After being thoroughly over-

(Continued on page 44.)

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WASHINGTON, D. C., MARCH, 1894.

CAPT. EDMUND ZALINSKI, Fifth Artillery, inventor of the pneumatic dynamite gun, has been placed on the retired list. He was paralyzed two years ago and has never fully recovered.

THE mid-winter fair in San Francisco is not the success its promoters had anticipated. It is not considered a failure by any means, but coming so close on the heels of the great Chicago exposition it suffers from comparison.

JUDGE BELLINGER, of the United States Circuit Court at Portland, Oregon, decides that a Chinaman may marry by mail and no law can prevent the wife from joining her husband in this country. He holds that if the parties are married according to the laws of China, such marriage is valid here.

LONDON papers are advocating the adoption of the 1,000-mile railway book, good on all Continental railways. The convenience of such a system is set forth in an elaborate argument in which the inventive genius of the United States is alluded to as something phenomenal and worthy of emulation.

It appears from a recent report prepared by Assistant Commissioner Fisher that the work of the Patent Office is closer up to date than at any time in the past eight years. The greatest arrearage in any division is now less than four months, and the applications for patents pending number less than 7,000.

IN reply to the strictures of the *Washington Star*, the *Manufacturers' Record* denies having made gloomy forebodings about the South. It says it has persistently claimed that there is a steady tendency towards improvement, and that despite the Wilson bill the South would grow and prosper, but that with the Wilson bill and its unfair treatment of the South out of the way the South's development would be far more rapid.

THE INVENTIVE AGE calls particular attention to the paper published in this issue on "Interference Proceedings in the Patent Office," read before the recent meeting of the American Association of Inventors and Manufacturers, by Lemuel W. Serrell, of New York. It is an exhaustive compilation of the laws and rules governing interference proceedings, and will be found intensely interesting to patent attorneys and inventors.

THE principal reason given out for the President's veto of the New York and New Jersey Bridge bill is that after securing a charter from the State of New York containing the express stipulation that the bridge should have but a single span from shore to shore, the promoters of the enterprise secured from Congress in this bill the privilege of placing a pier in the river 2,000 feet from the New York shore. A bill is now pending in Congress in which this ob-

jection is overcome, but it is not especially desired by some of the promoters, and it is doubtful if it ever finds its way to the President.

ONE of the most important conventions of electric light and electric railway men ever held, convened in Washington on the last two days of February and the 1st day of March—the event being too late in the month to permit of an extended notice in this issue of the INVENTIVE AGE. The meeting was attended by the leading electricians, capitalists and railroad men in the country, and the papers read were numerous, interesting and instructive. A more extended report will appear next month.

INDICATIVE of the small but certain improvement in business the *American Manufacturer*, of Pittsburgh, Pa., says there were 131 blast furnaces in operation on February 1, having an aggregate weekly capacity of 108,321 tons, against 132 furnaces with a weekly capacity of 102,999 tons on January 1, showing an increase of about 5,000 tons in the weekly capacity during the month. Charcoal furnaces show an increase of weekly capacity of 300 tons and coke furnaces of 5,400 tons, while anthracite furnaces show a decrease of 400 tons.

BETTER service at lower rates for telephones is the cry in Washington and many other cities throughout the country. In the matter of telephone service American cities are behind the great centers of Europe, particularly in Germany and France, where great advancement in the service and reduction in the cost has taken place during the past two years. In long distance telephoning the development has been more rapid and successful than in local circuits, owing, possibly, to the monopoly existing in most cities in the telephone service.

THE report of William McDevitt, electrical inspector of the Philadelphia fire underwriters and fire patrol, on his investigations into the effect of underground electrical currents upon gas and water systems, will be the subject of much comment and discussion in the electrical world. The startling statement that his observations led to the belief that in all the large cities the gas and water systems are threatened with destruction by what is termed electrolysis is calculated to lead to further investigations in confirmation or disproof of Mr. McDevitt's theory. If, as Mr. McDevitt charges, these subterranean currents of electricity are slowly but surely destroying the great net work of pipes which furnish the gas and water supply of cities, then the electrician and the inventor are charged with a new duty—the discovery of some means of perfecting the application of electricity to street railways so that its escape in the ground will be reduced to the minimum.

THE review of trade by Dun & Co., for the week ending February 17, was a most remarkable one and probably marked the low water tide in business affairs in the United States. The week was a record breaker. In wheat, in silver, in some forms of iron and steel, in Connellsville coke, and in well known cotton and woolen goods, the lowest prices ever known were made, and it is gratifying that failures of importance have not resulted. The great fall in wheat had a perceptible influence upon the tone of business generally and there was less confidence in Wall street, less improvement in manufactures, and a greater decrease in the volume of payments, through clearing houses, which were 24.4 per cent. less than a year ago outside New York and 43.7 per cent. less than a year ago in New York, notwithstanding unusual transactions in grain. Wheat at 60 $\frac{3}{8}$ cents a bushel was lower by 1 $\frac{3}{4}$ cents than it had ever been in the previous seventy-seven years, and the visible supply, 79,000,000 bushels, is so much larger than had been previously figured on, faith in the official reports of the yield last year has been completely destroyed. There are, however, more hopeful signs in the manufacturing world. The surplus of manufactured goods throughout the country has been exhausted, and manufactories are resuming operations. As a result of tariff legislation, however, there exists a natural timidity among manufacturers,

and to meet the possible contingency of forced competition with foreign made goods, they are forced to make a cut in wages varying from 5 to 16 per cent. To the uncertainty and delay of tariff legislation may be attributed the continued and unprecedented business depression throughout the United States.

THE Court of Appeals has rendered an important decision in the "Palmetto" trade mark case mentioned in our last issue and commonly known as the "Governor Tillman Case of South Carolina." As will be remembered the Governor applied for a trade mark in July on behalf of the State of South Carolina to be used in connection with the law in that state regulating the liquor traffic. The Commissioner having declined to issue the trade mark, application was made in the Circuit Court of the District of Columbia which resulted in a preeminent command in the way of mandamus compelling the Commissioner to register the trade mark, from which decision the Commissioner appealed to the Court of Appeals of the District of Columbia. The opinion rendered by this Court, reverses the decision of the Circuit Court, and decides that the act of the Commissioner is quasi judicial, and therefore not a mere matter of ministerial action. The court further holds that no appeal lies in cases which involved trade marks. The law relating to appeals applies only to patents. They further decide that before a trade mark can be granted the person to whom it is granted must be engaged in commerce with a foreign nation or an Indian tribe, and that the State of South Carolina as a State had no authority to engage in such commerce. The law relating to the sale of liquors being confined to the limits of the State, was passed, therefore, rather with a view of regulating the police power relating to the sale of intoxicants, than to establish commerce. The case has been appealed to the Supreme Court of the United States, where in due time it will be decided, and from present indications the views of the Commissioner will be sustained.

NOTES AND NEWS.

Decrease in Immigration.—Only 5,578 immigrants arrived at the port of New York in January, 1894, as compared with 11,257 in January, 1893, and they brought with them \$82,200, all told.

* * *

Wind Power.—M. de Nansouty suggests that users of wind power might find it an advantage to surround the "atmospheric turbines" by strong towers, for directing the wind by nozzles, as water is lead to a Pelton wheel.

* * *

Aluminium Boats.—Two extraordinarily designed aluminium boats are being built in Baltimore for an arctic expedition. The work of construction is being carried on with the utmost secrecy. The projector of the enterprise is said to be the *Chicago Herald*. The plan is to organize a party and start in the early spring for the north.

* * *

Rich Reward for Astronomical Discovery.—The French Astronomical Society has just awarded to Prof. Barnum, of the University of Chicago, the Arago gold medal, in recognition of his discovery last year of Jupiter's fifth satellite. This medal has been conferred only once before, and then on the distinguished French astronomer, Leverrier.

* * *

Largest Draw Bridge in America.—The King Bridge Company of Cleveland, Ohio, is now engaged in preparing plans for an iron draw bridge, for the New York Central Railway Company, to span the Harlem river in New York City. It will be 400 feet long and swing on a central pivot. The estimated cost of the structure with its approaches, is \$3,000,000.

* * *

Holland's Submarine Boat.—The last naval appropriation bill contained an appropriation for the construction of a submarine boat, but after careful inquiry into the plans submitted Secretary Herbert decided that this type of a boat was not yet sufficiently perfected to warrant the expenditure of the appropriation. Mr. Holland, the inventor of the submarine boat bearing his name, has been collecting data at the Navy Department, based on the plans of the torpedo boat Cushing, with a view to its ap-

plication to the mechanism of his peculiar craft and it is possible another effort will be made to get Congress to provide again for the construction of one of these boats.

* * *

Remarkably Cold Weather in England.—An extraordinary incident of the unprecedented cold snap in England in the early part of January was revealed at an inquest in Liverpool. A woman, aged 62, slipped in her yard, and was unable to rise. Water from the tap fell on her hands and froze them in a solid mass to the ground, and she died from exposure.

* * *

The Most Costly Metals.—The most costly of all metals, save only gallium which is worth \$3,000 an ounce, is germanium, which is quoted at \$1,125 an ounce. Rhodium is worth \$112.50 an ounce; ruthenium, \$90 an ounce; iridium, \$37.50 an ounce; osmium, \$26 an ounce, and palladium, \$24 an ounce. The last is about equal in value to gold. These metals are of no great commercial importance.

* * *

Canal Across Ireland.—Sir Edward Watkin, the English railroad magnate, has put forth the serious proposition of a canal across Ireland to make a more direct road for trans-Atlantic steamers to Liverpool. This proposition has been coupled with the discussion of a tunnel between Scotland and Ireland. Sir Edward claims that both the tunnel and the ship canal could be built for \$100,000,000.

* * *

Heavy Bars.—The first three of the heaviest bars ever turned out under a steam hammer were drawn from the furnace of the Duquesne Forge Co., at Rankin Pa., last month. They will be used in setting up the big press in the armor plate mill at Homestead. The ingot of the first weighed 35 tons, and was worked under the big 10-ton hammer. It was reheated three times and required ten days to complete it. The second was the same size and the third 30 feet long and 14 inches square.

* * *

The Deepest Bore in the World.—Probably the deepest bore in the world is at Paryschowitz, in the district of Ribnik, in Western Silesia. The depth attained is 6,568 feet, and the diameter of the hole is only 2.75 inches. The work has been temporarily stopped in order to lower especial thermometers, which have been made with great accuracy, into the hole for the purpose of obtaining the temperature at the different depths. The boring will then be resumed, and it is expected that a depth of 8,200 feet will be reached.

* * *

Electric Clowns.—A novel performance was recently given in New York, at one of the well-known concert halls. Two Frenchmen dressed extravagantly, with bulbous and highly colored features, personated what they chose to term the "Electric Clowns." Their eyes, noses, cheeks and ears were so arranged, being supplied with miniature electric lights, that upon contact being made by means of metal plates in their shoes the intense rays of the lamps, burning above candle power, shone forth from the darkness of the stage. The effect was decidedly unique.

* * *

Remarkable Ocean Steamship Record.—A remarkable record in steam navigation was made the first week in February, says the New York Sun, when the White Star steamers *Britanic* and *Germanic* completed their two hundredth round voyage between Liverpool and New York, four hundred trips apiece across the Atlantic, a total distance in each case of one and a half million miles. They have carried between the Old and New Worlds over 100,000 saloon and 260,000 steerage passengers. They were built in 1874-5, and are yet working as efficiently as ever, with their original engines and boilers.

* * *

Electric Funeral Train.—The San Francisco and San Mateo Electric street railway company has inaugurated a novel funeral car service, and residents along its line are taking advantage of it. One writer in describing this novel invention says: "The six pall bearers who accompanied the hearse quickly lifted up the coffin containing the body and slid it gently in through the open door. Then, with uncovered heads, they climbed in after it and closed the funeral draped door. The conductor rang the bell twice, the motorman clanged his gong with a noise that seemed somehow strangely out of place, turned on the electric current, and the dead man started on his last journey. It was hard to realize that the two cars rolling rapidly along the street lined with gaping spectators were a funeral train—the shouts of the children along the route, the sharp clanging of the gongs, and particularly the speed of

the cars, were so totally dissimilar to the accustomed solemnity of such parades. People hurried to the windows of the houses along the line and few even waved handkerchiefs, as if it were a gala occasion of some sort."

* * *

The Deepest Mine in the World.—It has been the undisputed claim of Austria that she possesses the deepest metal mine in the world, the Maria shaft at the mines of Przibram, which was 3,675 feet below the surface at the time of the great fire in 1892. It has now been surpassed, says the *Engineering and Mining Journal*, by the No. 3 shaft of the Tamarack Copper Mining Company, in Michigan, which, on December 1, was 3,640 feet deep, and is now more than 3,700 feet, the average rate of sinking being about 75 feet a month. This makes it beyond question the deepest metal mine in existence, and only one other shaft has reached a greater depth, that of a coal mine in Belgium, for which 3,900 feet are claimed. The Adabert shaft in Germany reached a depth of 3,281 feet.

* * *

Power of Inventions.—It is not everyone who appreciates the importance of helping the inventors along. They are the salt of the earth. Congress can well go out of its way to consider any law which to any extent will assist them in getting a fair return for their ideas. If a system of laws could finally be enacted giving full and fair compensation to each inventor promptly, as one by one he discovered the secrets of nature, there would not be, as there are at present, so many of nature's secrets hidden from us. We might find that, instead of this world being one of incessant toil, nature intended it to be one of comparative ease, and instead of being a world of incessant worry, perhaps we should find nature intended it to be one of comparative contentment.—*American Journal of Politics*.

* * *

Decline in Cost of Transportation.—The cost of transportation has been on the decline for the last 10 or 12 years, and even for a much longer period. The decline in rates per ton per mile on all the railroads of the country has been from 1.236 cents to .967 cents from 1882 to 1892. The decline for this period was the least in the middle and central northern States, and the greatest in the South Atlantic and Gulf States and the northwestern States. The latter embraced the Granger systems. The result of these heavy declines has been disastrous in many instances, being more than the railroads could bear. It goes to show, however, that the cost of transportation is downward, which is an important factor in the cost of merchandise. Time and cost per mile of transportation are great agencies in equalizing prices in different markets.—*Manufacturer's Gazette*.

* * *

A Novel Railroad Proposition.—The Populists of Kansas are taking the lead in the proposed "North and South" railroad to connect Kansas, Nebraska, South and North Dakota with the Gulf. It is proposed that the farmers along the proposed line build, pay for and own the road. Treasurer Griffin, in a long circular, tells how it is to be accomplished: "The plan proposes for the issuing of stock at \$100 per share. Each purchaser of a share of stock is to receive twenty-two five dollar transportation certificates, which also may be purchased separately. When the road is completed these will be received as cash for half the price of tickets, freight and other charges. Income construction bonds are also to be issued by the company in sums of \$5, \$10 and \$20. These bear 5 per cent. interest and are to be paid out of the income of the road. They will be received for all dues, with a premium of 5 per cent. added. Cities, counties and townships will be asked to vote bonds to aid in the construction of the road. Lastly, the road may not be bonded to exceed \$10,000 per mile."

* * *

A Water Bicycle.—At first sight a water bicycle would seem a difficult thing to construct, but really it is very simple. Take two cylindrical air floats, and, placing them parallel with each other, fasten them together at a suitable distance apart. Here you have a raft. Now suspend the frame of the bicycle between the two, so that the front wheel will pass into the water to the depth of two or three inches. This forms the steering apparatus. Now fix to the spokes of the rear wheel cross-pieces of wood, precisely as the wheel of a side-wheeled steamer is constructed, and the propelling power is gained. The whole is capable of great improvement, for as now the ordinary bicycle is applied to the float, special and much cheaper forms could be got up, and also more of an advantage could be had in the economy of power. Indeed, one would have to go but a few steps further, and attach the twin-screw propeller to the aquatic novelty to produce desired results. As it now stands, the scope of the idea is limited to still water, the slowness of the affair making it

dangerous in its application to waters in any way turbulent. *Hardware*.

Extracting Gold from Beds of Rivers.—It is a well known fact that there has been deposited for ages, in the beds of many western rivers, from the wash of gold-bearing mountains, much wealth in the shape of fine particles of the precious metal. So plentiful are these particles of gold in the Columbia river, that Chinamen find it profitable to work the bars in the primitive way of pan and shaker. A great many schemes have been proposed for working the beds of rivers containing gold deposits. A partial solution of the problem exists in Idaho on the Snake river where a big floating barge has been constructed and is now at work. It is a flat boat, propelled by steam and constructed on the principle of a dredge, with a succession of scoops on an endless chain, each with a capacity of about 20 pounds. This is delivered in a hopper or agitator. The gold is caught by the use of quicksilver on the copper plates. By this scheme about 100 tons of gravel can be worked daily. This system is very good for working shallow streams and sand bars but will hardly do for rivers where the bed rock is down any considerable distance. Mr. E. H. Bly, of Bismarck, North Dakota, a gentleman who has spent some time in investigating the characteristics of these western gold-bearing mountain streams, has invented what would seem to be a more practical means of extracting the accumulated deposits of gold from river beds. His scheme is similar to the caisson used in sinking the piers of bridges in rivers of the nature of the lower Mississippi and Missouri. By employing a portable combination caisson Mr. Bly figures he can use a syphon for the expulsion of the sand and water down to bed rock and thus work out the precious metal that undoubtedly has accumulated in fabulously rich quantities in many of the streams having their source in the Rocky Mountains.

The Order of Invention.

The order in which inventions succeed one another genetically is a mimicry of the order of Nature. In the plant and animal world, whether we regard the evolution of the individual or of the species, the progress is from the simple or homogeneous to the complex or heterogeneous or complicated form. Now in working out the family trees of inventions no other method should be followed. But here is a real trouble. Place and environment govern to a large extent arts and industries. So, the parentage and descent are disguised in the materials and other limitations. But, with caution, it is possible to establish a certain number of grades or steps of culture, say seven, according to Morgan, and to arrange each occupation or calling of men along in a scale. Suppose one should rule a large sheet of paper into eight columns, reserving the left hand column for the names of invention of activities. At the top of the other seven columns he would place the Roman numerals, I-VII. In the spaces under these and corresponding to each line represented by some classic word should be written the term which indicates the progress at that stage. The whole chart would then represent the progress of the world. For instance, cooking of corn is thus given in Payne's history of America: "I. Green corn torrefied, and rubbed in the hands to detach the husk; II. Ripe corn torrefied or otherwise pounded or ground or made into paste; III. Corn steeped and boiled, furmet; IV. Meal boiled in water, porridge; V. Paste rolled into thin cakes and fried or grilled; VI. Paste baked into thin cakes, unleavened bread; VII. Leavened bread." Every thing or process, or implement, or institution, or law of man is capable of similar treatment. Indeed, the following up of these lines together would constitute the history of civilization.

O. T. MASON.

Brighter Outlook in Australia.

One of the main drags upon the progress of Australian productiveness, says the Melbourne *Telegraph*, has been in a great degree removed. The general reduction in wages opens up channels for the employment of labor which have not hitherto existed, and in an expansion in our export trade the most material and the earliest amelioration of the existing depression is to be sought for. Something is being done in this direction now, and if Australia is engaged in learning how to pay for its importations by exchange of merchandise rather than by increased indebtedness it will soon get accustomed to the altered conditions. We may even dread that before another eighteen months have gone by there will be too much eagerness on the part of the British investor to again embark his capital in Australian enterprise. It is significant that deposits in the reconstructed Australian banks have already risen to par in the London market.

Whalebacks as War Ships.

A board appointed by the Secretary of the Navy, consisting of Commander Sperry, of the Ordnance Bureau; Assistant Constructor Hibbs, and Assistant Engineer White, is now engaged in an examination of the models, plans and specifications of Capt. Alexander McDougall, of West Superior, Wis., which was submitted with a view of providing for an auxiliary naval force on the great lakes. Capt. McDougall is the originator of the whaleback idea and his proposition is not only to construct men-of-war on this principle, but to modify and strengthen existing vessels of this type to carry armament when needed. The board will endeavor to find out what effect placing a sixty-ton gun on a whaleback ship will have on the vessel, and it is not unlikely that Capt. McDougall will ask for a test to demonstrate the feasibility of the scheme he proposes.

ELECTRIC TRANSPORTATION.

A Novel System Proposed for Rapid Transit from Chicago to New York.

The agitation of the question of Erie canal boat propulsion by electricity has given renewed interest in the proposed scheme of rapid electric transit by rail between the two great cities. Alonzo C. Mather of Chicago has conceived the idea of combining, practically in one system, the electric propulsion of boats on the Erie canal and fast express and passenger trains along the banks of the canal, on what is familiarly known as the "tow path." He argues that throughout the course of the Erie canal the same system of wiring which would supply the current to the cars could be utilized to propel the canal boats

proper enlargement or deepening of the canal. Indeed, if the plan is found to operate satisfactorily, the next logical and necessary step would probably be to so improve the canal as to enable the use of larger boats. But for the present I am quite convinced that the proper course is to give electric propulsion a fair trial, and, if it accomplishes what is claimed for it, a new era of activity and prosperity should begin for our canals. Grain has been carried during the last season from Chicago to Buffalo for as low as one cent a bushel; boatmen can carry it profitably at two cents a bushel. If by cheaper and quicker propulsion the cost from Buffalo to New York by way of the Erie canal can be reduced to three cents a bushel, as is reasonable to suppose, there is no other carrying route that can successfully compete with it, and a continuance of New York's supremacy is assured. Moreover, the harnessing of the tremendous water torrent of Niagara to the wheels of industry will furnish the cities of Buffalo

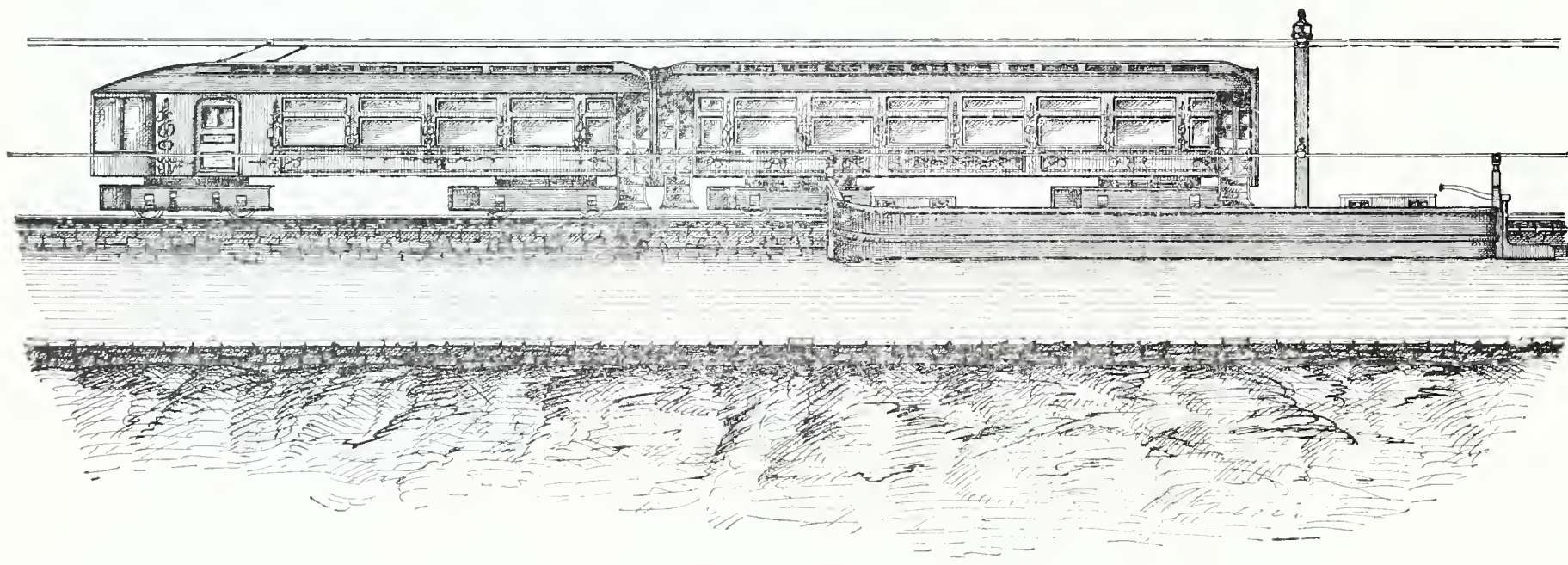
diameter, to which four screw blades were attached. To turn the propeller out of water required 5.35 c. h. p., which should therefore be subtracted from the above figures.

It will be noted that an inordinate amount of power was required and little more to propel the boat at 4.24 miles per hour than at 2.65 miles, which is a discrepancy not easily explained. In deep water it requires more than four times as much power to propel a vessel at the higher speed given over that required for the lower speed, and the power required in the latter case with the boat experimented on would probably not exceed three or four h. p. in deep water.

Additional interest is attached to the question of electricity on the Erie canal by reason of Mr. Mather's combined

scheme illustrated herewith. Mr. Mather says he has confined himself, in working out his system, entirely to the limits of the Erie canal tow path and the Erie canal proper, which will allow ample room for a great double track, high speed, electric system without interfering or inconvenience to any one. The conditions necessary to run a train with near-

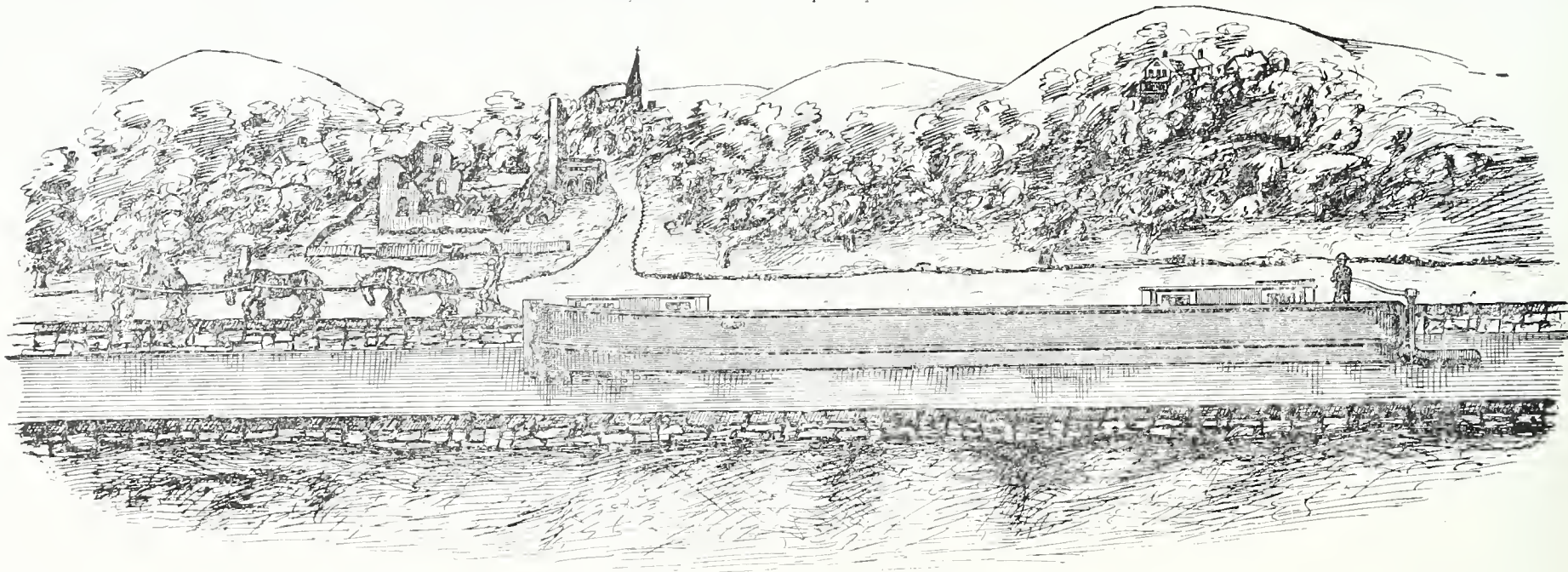
ly absolute safety at a rate of speed of 100 miles an hour, or more, are set forth by Mr. Mather—such as solid road bed, with third rail to prevent all possibilities of derailment by spreading of rails, or swaying of the train; reduction of friction to the minimum, by the use of heavier and higher rail in the center than on the outside; the studying of causes of accidents and applying means lessening them, etc.



SIDE VIEW OF PROPOSED NEW YORK AND CHICAGO ELECTRIC SYSTEM OF TRANSPORTATION.

at a great reduction over the cost of separate systems. That electricity will be applied in some manner, either by the use of storage batteries or overhead trolley, to the propulsion of canal boats, is only a question of time and a matter of determination as to which system is the most feasible. In his annual message to the New York legislature, delivered January 2, it will be remembered that Governor Flower recommended in very strong terms the adoption of electricity to take the place of the primitive means still employed—horses and mules. The Governor argues that the adoption of electricity would double the present speed of two miles an hour, which speed, it has been demonstrated the banks of

and Rochester and all Western New York with the cheapest power for manufacturing in the United States. We may look forward to the time when the great flour mills of the world will be located there, for the cheapness of power would more than compensate for the cost of transportation of grain from the fields of the Northwest. So with other manufacturing. Then, more than ever, will be needed cheap transportation through the State. Today the Erie canal does not carry one half its capacity. Reduce



THE PRIMITIVE MANNER OF PROPELLING BOATS A DISGRACE TO THE NINETEENTH CENTURY.

the cost of transportation and increase the speed and the tonnage will increase, and when the tonnage increases then will be the proper time to seriously consider expensive schemes of enlargement."

Bearing on the feasibility of the scheme, in his annual report, Superintendent of Canals Edward Hannen prints without comment the report of Mr. C. R. Barnes, city electrician of Rochester, whom he had engaged as electrical expert for the recent trial of trolley electrical canal propulsion. Two tables are included in the report, giving the result of measurements made, of which the following are the averages:

Average speed.	Amperes.	Volts.	E. H. P.
2.65 miles.....	63.08	294	24.87
4.24 miles.....	63.55	313	26.21

The boat was 98 feet long and equipped with a "dish pan" propeller having a disc of 511-2 inches

On the necessity for immediate relief for the Erie canal boatmen, Mr. Mather shows by authentic figures that the relative cost of propelling boats on the Erie canal by steam and horse power is, for round trip as follows; steam, \$400, for a fleet of four boats—about \$100 for each boat; horse power, \$237.40 each boat—about \$137 greater than by steam.

Electricity will effect a still greater saving and is unquestionably the coming power for the propulsion of canal boats as well as for cars, for the simple reason it is so particularly well adapted to do this work, and can be applied with comparatively slight expense. The accompanying illustrations contrast the present means of transportation with that proposed for the great nautical highway from the lakes to the ocean.

the canal will stand. The Governor compares the cost of steam and electricity and finds in the latter system a prospective saving of 20 to 30 per cent. It is argued that the benefit to the canal would be immeasurably greater than benefit which would flow from all the proposed enlargements, and need not cost the State a penny. Boatmen could make many more trips in a season, fewer employes would be needed on each boat, no money would be required for horses and mules, the large space occupied by the steam boiler and engine would be saved for freight, and danger from fire or explosion would be avoided. At the same time the increased tonnage and business of the canals would provide more employment and more remunerative occupation for boatmen. Continuing the Governor said:

"This plan need not interfere, either, with any

New Electric Road Carriages.

The development of electrical science is becoming more and more noticeable on every hand, but more particularly in the line of power and light. For the propulsion of railway cars and canal boats electricity has proven a success, and its application to vehicles not confined to water or rail is just now passing out of the experimental stage into the field of practical utility. This is an age of rapid transit and the demand is no less on the streets of a great city or the highways of agricultural districts than on the railway systems and in lake, river and ocean traffic. The speed of the horse, developed to its greatest capacity, is not sufficient to meet the requirements of the people and the inventor and scientist is called upon to apply electricity to land vehicles. Germany and France have taken the lead in experiments leading to the perfection of electrical vehicle locomotion. The Benz motor and motor-wagon, first shown at the Munich Exposition, is a practical solution of a mechanical road and street wagon. This invention is built on perfect lines of construction and is ready for practical use. Over 500 of them are now in use in Germany.

As a system of street car locomotion experiments have been made with the Benz motor, and complete success has been demonstrated. The most valuable of practical results have been attained as to speed, power and cost of operation. From the point of cost the figures already at hand, from actual experiments, show that this form of power is far cheaper than any other system yet devised. Not only has actual use and demonstration of utility and success set its seal of approval on the Benz motor as an agent of any sort of travel by land, but royalty as well has stamped its approbation on the invention. An accompanying illustration shows a motor cab that has risen into fame. For in it, on September 9 last, the Emperor William rode from Maxau to Lauterburg in company with Instructor Frederick C. Haas of the company. The trip, a distance of fifteen miles, was made in thirty-five minutes, an average speed of two and a third minutes to the mile. During the run his Royal Highness entered into the spirit of the occasion, showing the greatest interest and enthusiasm and speeding the carriage to the top notch of its capacity. Several continuous miles were covered at a very much faster rate of speed. On his return home the Emperor ordered a very luxurious pleasure carriage to be built at once for his private use.

In Rheims, France, the application of electricity as motive power for carriages used on public highways has become so general that it is made the subject of an official consular report, in which Consul Henry P. du Bellet goes into the matter with great detail.

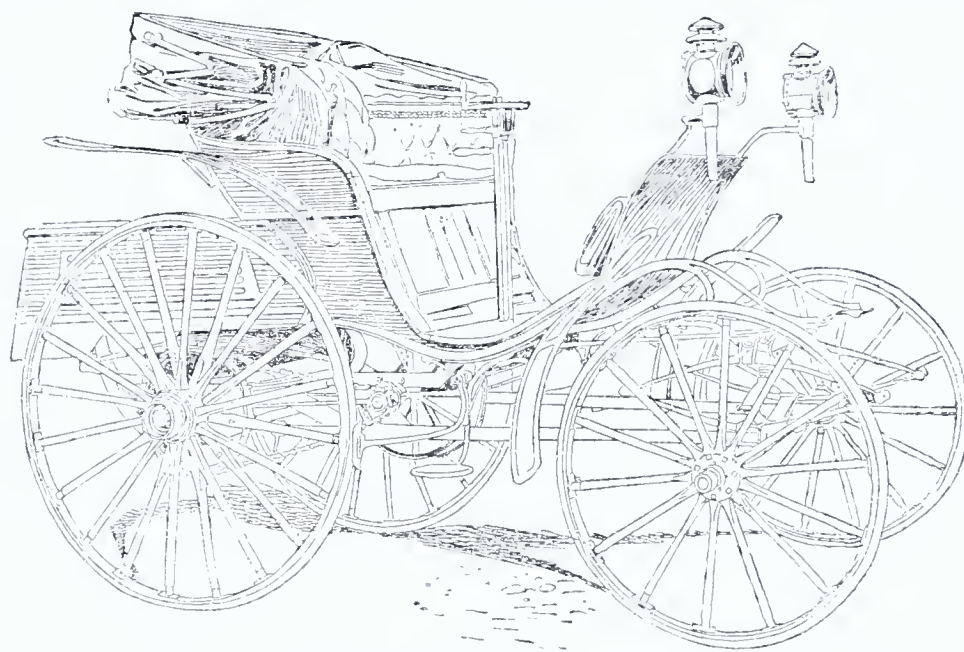
The first application of electricity to this mode of locomotion dates back to 1881, when the late Gaston Planché, a Frenchman, made the first experiments, which, however, proved unsuccessful at that time, principally on account of the imperfection of the sheets used, which was lacking in energy, strength and durability. In 1888 Mr. Immisch built in London, for the Sultan of Turkey, an electric dogcart resembling the dogcart of Mr. Magnus Volt, of Brighton, at a cost of 5,000 francs. The battery used in this dogcart was sufficient to propel it during five hours at a speed of 16 kilometers per hour (9 miles 1,484 yards). The battery weighed 350 kilograms (770 pounds) and the whole vehicle ready for the road, exclusive of passengers, weighed 575 kilograms (1,243 pounds). The motor used was the "Motor Immisch," of one horse power, which, in its full capacity, absorbed from 20 to 25 amperes and 46 volts, or from 1,000 to 1,200 electric watts.

The latest electric carriage is that of Mr. Paul Pouchain, of Armentieres, department of Nord, France, and it is considered as the solution of the problem studied for many years by the French electricians.

The carriage is a six-place phaeton built on four wheels. All its upper part is movable, so as to facilitate the inspection and care of the condensers and electric motor. The electric current is fur-

nished by a battery of condensers "Dujardin" composed of six boxes of nine elements, or altogether fifty-four elements. Each box is 44 centimeters (17 inches) in length, 33 centimeters (14 inches) in width, and 31 centimeters (13.6 inches) in height.

Each element contains one positive and two negative sheets inclosed in a box of ebonite. The nine elements are coupled together in tension and always in the same manner. The recipient containing the elements is hermetically closed with a piece of ebonite, and the lower part of the lid is covered with a thin piece of rubber one millimeter (three one-hundredths of an inch) thick and extending outside about one centimeter (three-tenths of an inch). When the lid is placed on the box, the rubber is thrown up and hermetically closes the element. Thus each element can be easily inspected, examined and kept in good condition. The nine elements are inclosed in a box made out of pitch pine, forming thus six batteries entirely independent and communicating through twelve wires (two in a box) to the commutator. The commutator, made out of bronze, is a cylinder in the shape of a dodecagon, on ten sides of which are placed pieces of copper electrically insulated from the body of the commutator and connected together in a permanent manner. In using the lever the commutator turns and can be placed in five different positions establishing contacts between the pieces of copper and fourteen elastic jaws communicating through twelve wires



THE BENZ ELECTRIC CARRIAGE USED BY EMPEROR WILLIAM.

to six batteries and through two wires to the motor. The following are the connections made by the commutator in its five positions:

Position at rest.—All the condensers circuit disconnected. Motor in short circuit putting on the brake for stoppage.

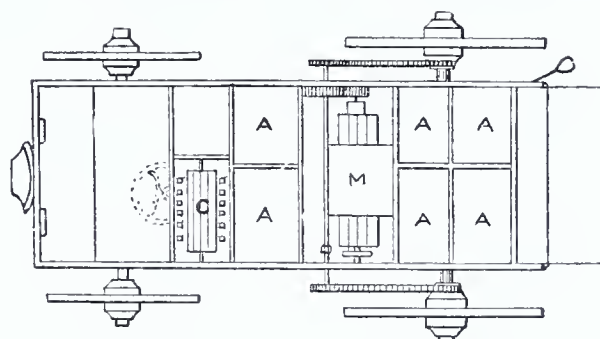
Position of first speed.—The six batteries placed in derivation on the motor (17 volts).

Position of second speed.—Three batteries of two elements on tension (34 volts).

Position of third speed.—Two batteries of three elements on tension (50 volts).

Position of fourth speed.—The six batteries on tension (100 volts).

The motor is of the system "Rechniewsky" of a normal energy of 2,000 watts, able, when necessary,



A. Accumulators. C. Commutator. M. Motor.

to develop as much more. It is placed in the center of the carriage, and, by the means of a Vaucanson (endless) chain, puts in motion a shaft revolving on the system of differential motion.

Over the back wheels are placed four batteries of accumulators or condensers, the motor and the differential system controlling the wheels; under the front seats are the two other batteries, a commutator coupler and a tool box. On the dashboard is an

electrometer, a disconnecter and interrupter of the lights placed in the three lanterns, and an interverter to back the carriage.

Under the vehicle are found soft wires, which can be connected with a stationary dynamo for the purpose of reloading the batteries. The mechanism for guiding the carriage is applied to the fore part of the carriage, to which is added a screw wheel put in motion by an endless screw ending under the hand of the driver and of very easy management.

This carriage, all ready to work, weighs 1,350 kilograms, or 2,970 pounds, and carries six passengers. On a pavement in an average condition 70 kilometers (42½ miles) can be covered at a speed of 16 kilometers (9 miles 1,484 yards) per hour without reloading the batteries, and the carriage can be turned entirely around on a street less than 4 meters (13.1 feet) wide.

On a level and on an average pavement the usual speed naturally depends on the number of accumulators, the greatest speed—16 kilometers (9 miles 1,484 yards) per hour—being furnished by using six batteries on tension.

An Invention Needed.

I may give another tip to inventors as to the desirability of providing a means of closing watertight bulkhead doors of large vessels, in time of danger, from the upper deck or from some center position. As it is, these doors are stout and heavy; they slide in ways which may or may not maintain their truth in view of the strains to which the whole is subjected; they are not kept well lubricated, (although the use of black lead for these would be better than the grease at present employed), there should of course be some alarm that would prevent any one being caught between the door and the bulkhead, which was the cause of the lamentable death of Commodore Garner of one of our New York yacht clubs some years ago. At present, the provisions for keeping the doors closed are very good, they are often locked and the key is hid away in some place near the door known only to the man billed to take

charge of that post, or is in the pocket of that man, who may happen to be in some distant part of the ship. Still, difficulty of getting the doors open is much preferable to delay or risk in getting them closed. Such an arrangement as is now used to open the doors of the Broadway Theatre, from any one of eight points in the house, in time of fire, might be used with suitable alarm, to close these bulkhead doors. Such a provision would have spared us the heart-sickening catastrophe of the Victoria, so recently run down by her sister vessel the Camperdown.

ROBERT GRIMSHAW.

Recent Electrical Improvements.

Thomas A. Edison has recently been devoting himself to improving his phonograph. The improvements consist in doubling the capacity of the cylinders, a new, less expensive and more efficient battery, increasing the volume of sound and general effectiveness of the instrument and reducing its original cost and operation.

Another of Mr. Edison's recent inventions—one calculated to amuse and entertain the public—is called the kinetograph, to be operated somewhat on the lines of a nickel-in-the-slot machine. The kinetograph is an instrument for instantaneous photography, controlled by a peculiarly constructed mechanism which is said to cause the instrument to produce about forty photographs per minute. The machine operates so rapidly that every motion of a dancer's feet, athletic or other interesting performance is instantly and accurately transferred to a gelatine strip. It is the purpose to produce the gelatine strips at some central point, forward them to the different machines, which are set in motion by dropping a nickel in the slot, when the scenes are repeated in full view of the spectator.

Interference Proceedings in the Patent Office.

BY LEMUEL W. SERRELL, New York.

[Read Before the American Association of Inventors and Manufacturers, Jan. 16, 1894.]

The United States is the only country where an intelligent provision is made for determining who is the first inventor of a particular improvement.

Interference proceedings have been developed to their present condition by rules founded on experience rather than by express statute.

Sec. 9 of the act of 1793 provided for the appointment of arbitrators as follows:

"That in case of interfering applications, the same shall be submitted to the arbitration of three persons, one of whom shall be chosen by each of the applicants, and the third person shall be appointed by the Secretary of State; and the decision or award of such arbitrators, delivered to the Secretary of State in writing, and subscribed by them, or any two of them, shall be final as far as respects the granting of the patent; and if either of the applicants shall refuse or fail to choose an arbitrator, the patent shall issue to the opposite party. And where there shall be more than two interfering applications, and the parties applying shall not all unite in appointing three arbitrators, it shall be in the power of the Secretary of State to appoint three arbitrators for the purpose."

Sec. 5 of the act of 1790 and Sec. 10 of the act of 1793 provided that a patent should be repealed if it was not granted to the first and true inventor, but Sec. 9 of the last named act was the first to provide for deciding who was the first inventor before the patent was granted.

By the law of 1836 the Commissioner of Patents was charged with the duty of determining priority of invention between interfering applications or between an application and an unexpired patent. From the decision of the Commissioner an appeal might be taken to a board of examiners appointed by the Secretary of State, before whom the parties could appear with their evidence, and the question was to determine "which or whether either of the applicants is entitled to receive a patent as prayed for."

This act of 1836, Sec. 16, provided for a review of decisions by bill in equity so as to declare either patent invalid or that an applicant is entitled to receive a patent "as the fact of priority of right or invention shall in any such case be made to appear," and the act of 1839 allowed an appeal to be taken to the Chief Justice of the District Court of the United States for the District of Columbia. This was subsequently, in 1852, extended to either of the assistant judges.

In the rules in force as late as 1866 no particular order for taking testimony was provided. The interference notice was sent to the parties and a day fixed for closing testimony and another date for the hearing. Notices had to be served of the time and place of taking testimony and opportunity given for cross examination, and access was allowed to the testimony of the opposite party in the presence of an officer.

Under this condition one party delayed taking testimony as long as possible in the hope that the other party would take his testimony and show his hand first, and unscrupulous parties sometimes gave notice for taking testimony simultaneously in two or three places, or for taking testimony at the same time as an opponent, so as to prevent if possible cross examination of witnesses or to hamper an opponent.

In the rules of Aug. 1, 1869, the order for taking testimony was first defined so that the first applicant to make oath to the invention was required to take testimony by a certain time, and the other applicant or applicants were assigned times for testimony and rebuttal. This order was partially evolved from disorder and chaos.

By the rules of November 1869 the order for taking testimony was made the reverse of the dates of filing the application, and when an interference was requested with a patent that had been granted more than two years, the applicant was "required to file an affidavit setting forth the date and history of his invention." This is believed to be the origin of the present requirement of Preliminary Statements.

In the rules of July, 1870, Commissioner Fisher

first required the filing by each party of a sworn statement of the date and history of the invention. This however was not termed a "Preliminary Statement," until the rules of 1871 were published. In requiring such preliminary statements the name of the opponent was not given.

The law of 1870 repealed all the prior laws that were in force, and Sec. 42 alone applied directly to interferences; it however did not change the principles upon which a decision was to be made but required the primary examiner to determine the question of priority of invention. An appeal could be taken to Examiners in Chief or to the Commissioner, but Sec. 48 prevented an appeal to the District Court in interference cases.

The Revised Statutes approved in 1874 and which took the place of the prior acts, repeat in Sec. 4904 the provisions of Sec. 42 of the act of 1870, and Sec. 4911 still prevented an appeal in interferences from the decision of the Commissioner.

The rules as they are now in force have been evolved by the necessities that have arisen from time to time. Sec. 4905 R. S., allowed the Commissioner to make rules for taking testimony, etc. Sec. 475 R. S., makes the Patent Office a part of the Department of the Interior, and Sec. 481 requires the "Commissioner of Patents under the direction of the Secretary of the Interior," to "superintend or perform all duties respecting the granting and issuing of patents directed by law," and Sec. 483 requires the establishment of regulations *subject to the approval of the Secretary of the Interior*.

In the rules of March 1873 Commissioner Leggett required the names of the opposing applicants and *dates of filing* to be given in calling for preliminary statements, and a clause was added that the parties would be strictly held in their proofs to the date set up in their preliminary statements.

In the rules of August 1877 Commissioner Spear inserted a clause allowing corrections to be made to preliminary statements where error had arisen through inadvertance or mistake and upon showing of the same to the satisfaction of the Commissioner.

Commissioner Paine in 1879, revised the rules concerning interferences, and the date of the opponent's application was not furnished, and the duties of the Examiner of Interferences were more clearly defined.

When Commissioner Marble took charge of the Office he sought to enforce the rules with rigor, and in the middle of 1881, refused permission to one of my clients to amend his preliminary statement, by referring to a caveat on file in the Office, which in the multitude of other applications and caveats the inventor had forgotten. This was clearly illegal, as the request was within the rule allowing correction of preliminary statement, and as the question related to the *interpretation and enforcement of the rules*, I carried the matter on appeal to the Secretary of the Interior under Sec. 475 and 481 R. S. The appeal was entertained and the Commissioner was overruled. After this the Secretary substantially constituted himself an appellate tribunal in all interference matters.

This, I was well satisfied, was a mistake, but inasmuch as the way was open for such an appeal, it was availed of in numerous interferences.

In the case of Gill vs. Scott, the Examiner of Interferences and Examiners in Chief decided in favor of Scott, but the Commissioner reversed their decision, and an appeal was taken to the Secretary of the Interior, and he decided in favor of Scott; thereupon the Commissioner refused to receive Gill's final fee, and Hoe, assignee of Gill, applied in 1884 for a mandamus, and the Supreme Court of the District of Columbia decided in substance that the Secretary of the Interior has not jurisdiction, and this terminated all appeals to the Secretary of the Interior in interferences. (O. G. 27, P. 519).

In the original appeal before mentioned, the matter of receiving an amendment to a preliminary statement was properly decided by the Secretary of the Interior, and an appeal will still hold to him in any matter concerning the interpretation or enforcement of any rule. (O. G. 63, P. 1687).

The Rules of Practice in interference cases are intended to secure justice, but interferences are often instituted where they ought to be avoided. It sometimes happens that the wording of the issue is different from the claims of either party, and the Examiner has made up the issue from his own standpoint, and neither party desires an interference or could make the claim proposed, as the applicants may possess information concerning which the Examiner is ignorant. It is believed that the practice would be simplified by the addition of a rule generally as follows:

"When an Examiner finds substantially the same patentable invention in two pending applications or in a pending application and an unexpired patent, he shall notify the respective parties what the supposed novel subject matter is; and where such subject matter is different from the claim or claims as originally applied for or granted, he shall require within twenty days a new oath claiming such subject matter and setting forth that it has not been in public use more than two years, or else a statement showing why the subject matter is not patentable or why the wording should be changed; and in case either party alleges public use for more than two years, the place and times shall be given under oath or affirmation, and the action of the Examiner shall be taken in the light of the information so furnished."

It would in most cases be advantageous to have the grounds of interference well examined and useless interferences avoided, especially where neither party desires a contest. On the other hand, an interference should always be instituted where substantially the same invention is involved, and *claims should not be allowed to go to issue simply because they are worded differently from the claims in another application or patent*.

This Association cannot do a greater service to the cause of protection to inventions than to denounce in the most unmeasured terms the views that have been promulgated by some in the profession and even by some of the officials, that the invention consists in the words in which a claim is framed. This is nonsense. A man does not patent words; the invention is the thing that is patented, and the words of the claim are simply the medium by which attention is drawn to the special features of invention that the applicant desires to protect; and because one person rings the changes in words and expressions and combinations without number, the invention remains the same, and it is an Examiner's duty to see if the *inventions contain the same patentable subject matter regardless of the words of the claims*.

Attention has been called to this phase of Interference Proceedings, in the hopes that such meetings as the present may serve to mould professional and official opinions into an appreciation of the justice and propriety of exercising the best judgment and common sense in the intricate and difficult proceedings that are inseparable from the determination of questions of priority of invention.

The profession appreciates these difficulties, but the general public, members of Congress and others are often not sufficiently familiar with such proceedings to understand the nice discriminations and careful considerations required in making a judgment.

Sec. 4919 R. S., speaks of a prior inventor "*who was using reasonable diligence in adapting and perfecting*." This statement underlies every decision in an interference. In the race of diligence, the first to start does not gain the prize unless he is diligent. The matter of diligence may be modified by poverty, sickness, or even by ignorance of what might overcome a difficulty. Besides this, an *invention is not an experiment* that falls short of accomplishing the desired object, neither is an invention a *desire* to accomplish a certain object unless it is accompanied by a recognition and development by sketches or descriptions of the means necessary to effect that object.

In the multitude and complicated character of the questions thus arising and which are never alike in two cases, I have charity even for those who may decide against me, and I am disposed to believe them sincere and to have exercised their best judgment, even in cases where an interference decision may appear contrary to common sense. An illustration

in point existed in a case where there were some ten or twelve claimants in an interference, and about fifteen attorneys were concerned from first to last, and the proceedings extended during a period of more than three years, and motions without number had been made and decided. The Examiner of Interferences decided in favor of two of the parties, one count to each. The Examiners in Chief decided in favor of a different party, and when the Commissioner rendered a decision he reworded the counts of the interference so as to put one of the devices where it could not work, and at this all parties concerned had to laugh; and after it was all over, it was discovered that the Examiner had used words in the count to mean something different from what either of the inventors, the Examiners in Chief, the numerous counsel, the Examiner of Interferences or the Commissioner, had appreciated or considered.

A bill was introduced in Congress about a year ago to overthrow the entire system of interference proceedings and to put applicants to considerable trouble, and finally to decide nothing and even to grant a patent that was known to be invalid, and this was officially favored.

Inventors and manufacturers are under obligation to this Association because this ill-conceived plot was frustrated and the bill defeated principally by the efforts put forth by your committee on legislation.

One more subject. What think you of *appeals* in interference proceedings?

The laws of 1870 and 1874, expressly prevented appeals to the Supreme Court of the District of Columbia in interferences, but when the Court of Appeals of the District of Columbia was constituted by the act that went into force April 3, 1893, appeals in interferences were permitted.

This proceeding not only involves delay and expense but often a different attorney who is ignorant of the case, as the rules of the Court prevent a patent agent or solicitor appearing unless he has been duly admitted to the bar of that court.

Commissioners of Patents are changed for political and other reasons every two or three years on the average, and the executive duties of the Commissioner are so great that the labor of examining and deciding interferences should not be added thereto, but the appeal to the court does not lessen his duties, as he must decide before the appeal can be taken. My opinion is that the decision of Examiners in Chief should be final in interference cases, and the patent should be granted, and then if the aggrieved party desires, the proceeding by bill in equity under Sec. 4915 R. S., is open for the parties to obtain a decree of court on the question of priority of invention. This course, I am persuaded, would generally be the most likely to secure justice and in so doing delays and expense would be lessened.

Should there be an appeal from the decision of Examiners in Chief to the Supreme Court of the District of Columbia, it would appear proper for the attorney conducting the interferences in the Patent Office and who is supposed to be familiar with all the facts, to be permitted to present them to the Court.

I, however, believe that the Patent Office has the facility and the experience by which to decide the knotty questions arising in interference proceedings much more justly and accurately than any court that is a stranger to such proceedings and usually limited in its time and occupied with such a variety of subjects and laws as not to be well adapted to make a careful and reliable decision in the intricate questions arising in interferences.

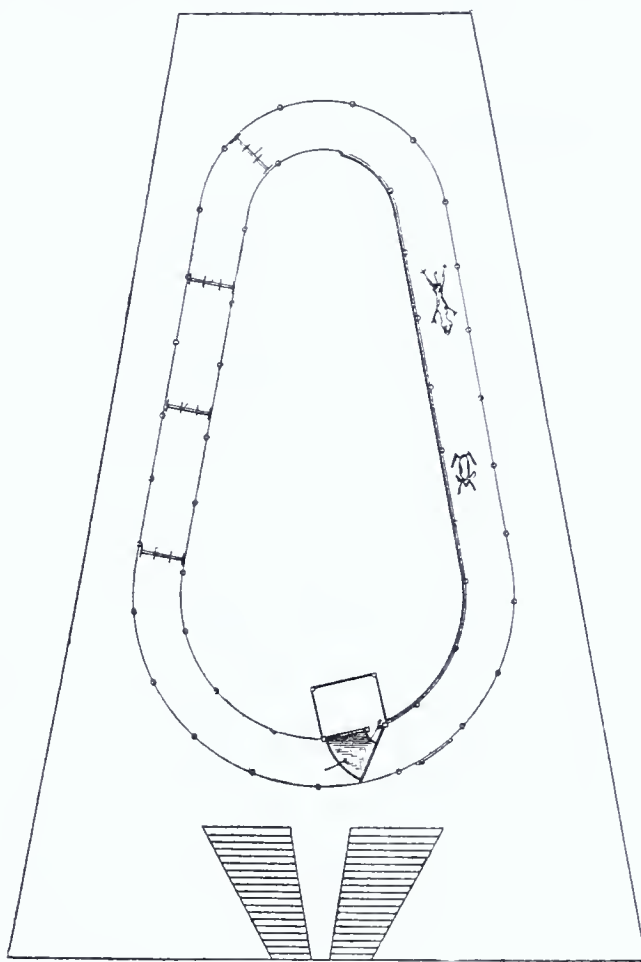
I am sure every one in the profession and all of my hearers desire that the original and first inventor who has exercised reasonable diligence in adapting and perfecting his invention should be protected against the thief who seeks to carry off that which does not belong to him, and also against the lazy man who does not complete his invention until he learns of the success of another, and also that the rights of the public should be recognized and enforced.

By concerted action this Association can aid in properly directing official action and in obtaining any needed legislation. It may, however, be remarked that the principles on which interferences

are supposed to be decided are certainly correct, and have been developed by a long series of legal decisions, and the point to be considered is how best these principles can be carried out in the Patent Office practice.

Game Chasing Device.

Mr. A. L. Leonard of Covington, Ky., is the inventor of a very ingenious device for country fairs, and other places. It consists of a fenced race course across which are located at intervals peculiar kind

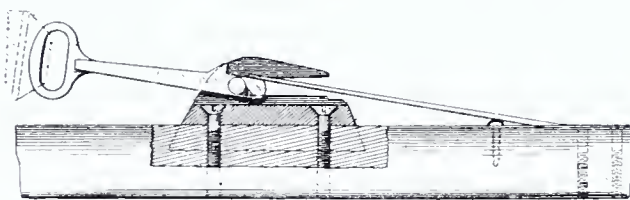


INVENTIVE AGE.

of hurdles which allow the game to pass through them while the pursuing hounds are forced to go over them. Mr. Leonard's patent issued January 9, 1894.

Finlay's Improved Holdback.

The holdback device shown in the accompanying illustration was invented by Wm. Finlay of Schoolcraft, Mich., and it is designed to greatly facilitate the operations of attaching and detaching the breeching. It consists of a thill attachment working on the snap-hook principle, and a peculiarly formed



INVENTIVE AGE.

link adapted to be attached to the breeching. This link is provided with a pair of trunnions which pass into two snap hooks, and it is also provided with a lug located above the trunnions so that when the outer end of the link is swung back this lug will press the springs of the snap hooks down and allow the trunnions to slip out, and the parts to be quickly unhitched.

New Machine Gun.

The new Australian quick firing machine gun is not intended for field use, but is to be mounted stationary on out works. It is only half the weight of the Maxim, and its average rate of discharge is about the same—300 rounds per minute, with a maximum of 320. The diameter of the bore is eight millimeters, being similar to that of the Mannlicher repeating rifle, now in use in the Austrian service. The barrel is encased in a water-jacket, and 1,200 continuous rounds can be fired before it shows the effects of the excessive heat. The cartridges are supplied as in the Nordenfeldt, from a large "hopper" fixed above the firing chamber. The gun is fired by means of an ordinary trigger with trigger-grip, and a recoil spring supplies the automatic action. The new mechanism in the Australian machine gun consists of an oscillating pendulum, which regulates the speed of fire, sustaining a moderately heavy discharge of fifty to 100 rounds per minute, and increasing it by means of a faster oscillation of the pendulum to 300 when a dangerous phase of attack has been developed. The saving of ammunition thereby is enormous. The mechanism is said to be very simple.

Latest Wonders of Electricity.

In a recent issue of McClure's Magazine, Edwin J. Houston, prompted by the wonderful development of electricity in the past, dwells upon a vision of some of the wonders yet to be performed by this mysterious force. He says:

"The edge of the electric future is bright with immediate promise for the world's weal. In the nearer foreground I see a practical method for the production of electricity directly from the burning of coal. This achieved, there necessarily follows the universal adoption of the electric motor as a prime mover; the relegation of the steam engine to the scrap heap, and the almost immediate realization of the air ship as a means of transportation. Assuming the cause of chemical affinity to lie in the unlike electric charges of the combining atoms, I see the practical realization of electric synthesis, whereby wholesome food products will be directly formed under the potency of electric affinities. I see, too, a marked advance in electro-therapeutics, whereby human life will be prolonged and its sufferings alleviated. Diagnosis and prognosis will be profoundly aided by exact electrical measurements of the various organs of the human body as regards their electro-motive force and resistance. The electro-therapist of the future will employ electric charges and currents for restoring the normal charges and currents of the body, as well as for the stimulation of nervous or muscular tissues. Back of these achievements I discern a practical apparatus for seeing through a wire: *i. e.*, a device for looking into a receiver at one end of a metallic wire and seeing therein a faithful reproduction of whatever optical images are impressed on a transmitter at the other end, even though thousands of miles intervene. I see the possible use of the step-down transformer for the preparation of a roadbed or road surface by the vitrification, *in situ*, of clay or other suitable soil, by the intense heating power of enormous currents of electricity. These things I believe I see with fair distinctness. In the farther background I faintly see, dimly outlined through the clouds, an apparatus for the automatic registration of unwritten, unspoken thought and its accurate reproduction at any indefinite time afterwards."

A New Electric Light.

Mr. C. F. Daniels, of Macon, Ga., has invented an electric battery from which he produces an arc light of great intensity, said to be superior in all respects to the arc lights now in vogue. The light produced is one of full volume, intense brilliancy and free from the flicker and flare of the ordinary electric light and illuminating with a soft, mellow light. Mr. Daniels claims that his battery is capable of producing 500 lights of equal volume and brilliancy of the one recently exhibited in Macon. He says the capacity of his battery is about 12-horse power, affording sufficient power for producing 500 lights, or for the propulsion of an engine and two coaches when utilized as a power for transportation over rails. A remarkable feature regarding this light is the harmlessness of the current of electricity necessary to produce it. The wires may be held with perfect safety in the hands of a child with the full current of electricity passing over them. The cost of production is said to be a mere trifle.

Expired Patents.

Among the more important patents expiring by limitation during the past month were the following: Ventilator for car windows, A. Brandon; typewriter, J. T. Anderson; furnace and process of manufacturing iron and steel, B. Bayliss; rock drilling engine, P. S. Buckminster; machine for rolling metals of irregular shapes, S. Duff; feed mechanism for sewing machines, H. Fecht; machine for twisting and spooling barbed fence wire, J. F. Gladden; gas regulator, E. O. Martin; compound telegraph wire, W. E. Rice; hydraulic engine, J. D. Richardson; telegraph insulator, P. Seller; electro-magnetic attachment for time locks, W. W. Sherer; breech loading firearms, C. Eutebrouk; Boston, Mass.; over-stitch sewing machines, W. A. Palmateer, Johnstown, N. Y.; mowers, William S. Stone, New Philadelphia, Ohio; rotary engines, P. A. Knapp and J. S. Knapp, Danbury, Conn.; sewing machines, E. H. Smith, New York city; rotary engines, Luigi D'Annia, Gaetano, Italy; threshing machines, John H. Edwards, St. Paul, Minn.; speed and distance indicators, G. M. Jesser, Portland, Oregon; elevators, Sigmund Levi, Cincinnati, Ohio; carbureters, John J. Paquette, New Orleans, La.; and revolving firearms, Daniel B. Wesson and James H. Bullard, Springfield, Mass.; knitting machines, William H. Abel, Laconia, N. H.; hydraulic elevators, E. H. Hunt, Chicago; printing presses, Carl H. O. Radde, Hamburg, Germany; gas manufacturing apparatus, Silas C. Salisbury, New York City; grain separators, J. D. Van Dusen, Auburn, N. Y.; mowing machines, A. Stevens, Gorham, Me.; coal mining machines, C. L. Driesstein, Chicago; safety cars, John Johnson, Brooklyn, N. Y.; car stoves, James H. Prentice, Saginaw, Mich.; cotton cleaners, Edwin H. Talarferro and S. Kline, Sr., Columbus, Miss.; printing presses, J. E. Braunsdorf and C. Kaiser, Pearl River, assignors to J. E. Braunsdorf & Co., New York city; cotton presses, A. H. Chetlain, Chicago, administrators of S. A. Clemens, deceased; sewing machines, W. G. Cummins, Coveville, Tenn.; sewing machines, Wm. Estey, Fitchburg, Mass., assignor to N. Corning, North Londonderry, N. H.; G. W. Hobbs, Uxbridge, N. H., and D. W. B. Jackson, Boston, and sewing machines, A. Leavitt and H. L. Drew, Boston, assignors to American Staple Sewing Machine Company, Boston.

The printing of the list of expired patents in the *Patent Office Gazette* and in the weekly index is a feature that will be appreciated by the public generally. The life of a patent is seventeen years and monopolies in the manufacture and sale of patented articles have not been at all expeditious in informing the public of the expiration of patents on which they are making large profits. Thus it has frequently happened that the people have continued to pay royalties long after the expiration of the monopoly. The inventor and the manufacturer should be fully protected during the term of the patent but the rights of the public are paramount at the end of that period.

Storage Battery Traction.

An article on storage battery traction written by George C. Maynard, the Washington editor of the *Electrical Review*, and published in that journal of January 31st, has attracted much attention. The article gives a full account of the experiments made by the Metropolitan Street Railway of this city, the only road in the country which ever really attempted to run its cars by storage batteries. There have been many exhibitions of storage battery cars on various roads in the United States but in almost every instance they have been made by the owners of the batteries whose attempts to operate them permanently and economically have not succeeded. The officers of the Metropolitan Company took the matter into their own hands and exhausted every effort to make the undertaking a success. The experience of this company will be of great use to all street railroad men. Mr. Maynard is a well-known writer on electrical subjects and his statements can be relied upon as candid and truthful. His report says:

Storage batteries have been weighed in the balance and found—too heavy. An honest man held the scales. George W. Pearson is one of the best all-round street railway men in the United States. For nine years he has been president and active manager of the Metropolitan Railway in Washington, D. C. During that period the necessity and the possibility of procuring a substitute for horse power for the propulsion of street cars has been one of the most important and pressing subjects he has had to consider, and he has given it the most careful and thorough study. Every known method has been investigated. These investigations led Mr. Pearson to a belief in the truth which everybody realizes and all disinterested persons admit that the ideal motor is one which will make every car independent of all the others.

The use of a cable was manifestly impracticable; the trolley system was prohibited by public opinion and a law of Congress; steam was out of the question; the proposition to use compressed air was an intangible scheme. On March 5, 1889, a special act of Congress declared that the use of horses should cease two years thereafter.

These facts pointed to storage batteries as most likely to furnish available power. Out of ten chaotic years of bitter contests and wasteful litigation over the rights of rival claimants to the invention, there came fair prospect of commercial utility, backed by strong assurances from men of good judgment and sincere purpose. Some of the most competent electrical engineers in the country unhesitatingly declared their conviction that street railways could be successfully and economically operated by this system.

In the summer of 1889 Mr. Pearson and his associates determined not to add one more to the long list of trifling experiments, but to operate their road with storage battery cars if it were possible. In the course of four months after the undertaking was started the first car was put on the road. Experimental trips were made at night after the day's traffic was done. With a fair load of the company's officers and directors a speed of 15 miles an hour over the whole line was attained and the prospects of success brightened. Additional cars were equipped, and, early in 1890, several were put on the road for regular service, sandwiched between horse cars and running at a uniform rate not exceeding six miles an hour. The fact that they were limited to this slow speed when they could easily go much faster, was a trial to the ambitious motormen who were disposed to regard their positions as quite superior to that of the car horse drivers. Passengers patronized the new cars and the public watched their progress with much interest. Public opinion turned in their favor, and for a while there was frequent expression of the opinion that the problem of rapid transit in large cities was solved. Still the months ran on into years and the horse cars were not displaced. Then there began to be surmises that the Metropolitan Company was only trying to gain time by making a show of changing its system, and did not really intend to make the use of storage battery motors permanent, even if the scheme proved feasible. As time went on the motors began to show signs of weakness, being frequently seen slowly laboring up the grades with a long line of horse cars behind them, and now and then blocking the road with a flat refusal to move another foot. In such cases their excessive weight precluded the possibility of removing them from the rails, the horse cars were jumped around them until relief could be obtained, when the proud spirited motorman was compelled to resign his command to a plebeian driver and four of the strongest horses from the stable would ignominiously drag the lumbering old ark back to the seclusion of the power house. As many as four cars were stalled at one time. But this was

not altogether discouraging, for while the result of the trial of the first storage battery was not successful, the respective promoters of nearly a dozen other schemes stood ready to guarantee that their batteries would do the work. Every one of these was given an opportunity to demonstrate the truth of their claims, and nine different styles of accumulators were tested. The company provided every facility for charging and operating the batteries, and allowed the experts of each company to personally supervise the operations and to show what they could do. An inspection of the Metropolitan Company's power house and facilities for operating the battery cars clearly evidences the seriousness and determination with which Mr. Pearson undertook the work. The buildings are substantial, spacious structures erected especially for the work. In addition to the extensive and substantial character of the buildings above described, an item on the company's cash book of \$387,000, expended in constructing the plant and operating the motor cars, substantiates the statement that the company has left nothing undone to work accumulators for all there is in them. Forty cars were built especially for this work, and fifteen of them were fully equipped for service. The highest number of cars ever out on the road at one time was ten. To sum up the elements of the undertaking, the following points are clear: Steam plant perfect; dynamos and accessories, comprising the charging machinery, everything that could be desired; facilities for handling the batteries admirable; cars and their motor equipments of the best; the track newly constructed by the Johnson Company, of 62-pound improved grooved girder steel rail and in excellent order; the best professional skill obtainable; intelligent, skillful and energetic business management—all essential elements to success—and success must have been attained had the performances of the accumulators been equal to the company's expectations and the promoter's promises. As the records stand, failure must be written for every one of them. They started out with high hopes and ambitions, but hopes were doomed to disappointment, while ambitions and amperes disappeared together. The best batteries tested did not stand more than twenty-seven days actual service, and the cost of running the cars by five of the most serviceable batteries ranged from 12½ cents to 37 cents per car mile. The cost of running horse cars on this line is about six cents per car mile.

The causes of failure are numerous and not easy to enumerate. Buckling plates, excessive heating, loosening of active material, short circuiting of cells from various causes, general rapid deterioration of positive plates, sudden and sometimes unaccountable loss of current, destruction of connections by acid, are some of the more marked eccentricities of the accumulators. There is a lingering suspicion that they are safer in the laboratory of a professor of chemistry than on a jolting tram-car.

After more than four years of intelligent and persevering effort the undertaking has been suspended. The motionless machinery, the idle cars and valueless batteries, the enormous hole in the company's bank account are full of significance. Every available means to attain success was tried, and failed. The experiment has settled many vexed questions, exploded some humbugs and will be of great value to all persons interested in street railroads. It has made it clear that, up to the present time, science and art have not produced a storage battery capable of supplying power to practically operate such roads as the Metropolitan.

Still the result does not justify absolute condemnation of storage batteries for railway use, nor destroy hope of an independent railway motor. Such a motor is demanded by public need, the inventive genius of the world is challenged to produce it, and there is a growing faith that, somewhere in the conserved forces of the universe, there is a power which shall wipe the unsightly and obstructive trolley lines off the face of the earth, shall bury the power-wasting cables in their own grave, and turn the faithful car horse out to the enjoyment of green pastures and well-earned days of rest.

THE *Union Printer*, a New York weekly publication devoted to the interests of members of the International Typographical Union, contains the statement that Mr. Lee Reilly, a New York Tribune Mergenthaler Linotype operator, recently performed the remarkable feat of composing and correcting 411,200 ems of nonpareil in six consecutive nights of eight hours each. The Linotype machine is now being used in 170 newspaper offices. It assembles, aligns, justifies intaglio type and casts a metal bar with type faces thereon, thus superseding hand composition of movable type. By this method a publication has new faces of type from which to print each edition, as the bars are melted up as soon as stereotyped or printed from. The feat of Mr. Reilly—setting and correcting 411,200 ems of nonpareil type in 48 hours—establishes a new record and demonstrates what can be accomplished on a Mergenthaler machine when in the hands of an expert operator.

TORPEDO BOAT CUSHING.

(Continued from first page.)

hauled the Cushing will go north to be used in further torpedo experiments and training officers and men in handling this style of naval-destroying projectiles.

The *Pall Mall Gazette* intimates that it would be gratifying to learn of the relative efficiency of the new English torpedo boats and those built by Herr Schichau, of Elbing, Germany, five of the latter having recently crossed the Atlantic to enter the service of the Brazilian government. These German built torpedo boats were all able to carry sufficient fuel to cross the ocean and still be effective after their arrival without recoaling. It is claimed they can attain a maximum speed of about 27 knots in smooth water, and possess good seagoing qualities. Russia and Italy each have five of these craft in service. The English torpedo boats, while longer and slower than the Cushing, are yet 12 feet shorter than the German type. The latest English swift launch is intended to be more effective in torpedo boat destroying.

Market for Inventions.

After the first cost and selling price are determined the inventor should find out how many of the improved articles could be sold, provided everybody having use for the invention could be induced to purchase. This is the entire possible market, but the actual market is considerably below the possible one. Probably less than one third of the possible buyers can ever be reached or induced to purchase.

The entire possible market varies so much with different inventions that it is only practicable here to suggest what information will be found useful and how it may be best obtained. Take, for example, the invention of a rubber heel for shoes. Every person in the United States would be a possible buyer and the possible market would be indicated by the entire population.

An improvement in corsets would be limited to women and the number of women is about one fourth of the population, while an improvement in suspenders would be limited to men and boys, or less than one half of the population, because very small boys do not wear suspenders. So if the invention was a sewing machine, a cook stove, clothes wringer, or any article only one of which is used in each family, the entire possible market would be indicated by the number of families, which is about one eighth of the number of the entire population, because there is an average of about eight people to every family.

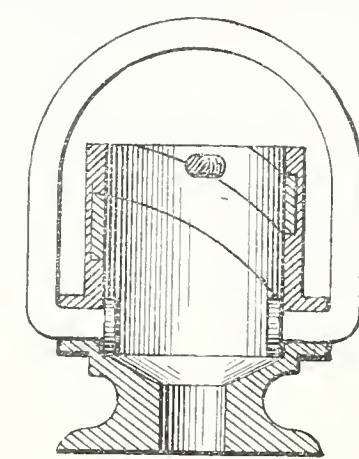
Then there are inventions used only by blacksmiths, carpenters or some special trade or profession and the number of such people will indicate the entire possible market.

The census reports are so full and complete that nearly every question, as to the number of people engaged in a specified business, can be settled by consulting the statistics given therein.

J. A. MINTURN, C. E.

Hallberg's Improved Watch Pendant and Bow Fastener.

The rapid wear on the watch pendants attracted the attention of Mr. Wm Hallberg of Fargo, North Dakota, who set about devising something that



would allow a bow to be more quickly replaced by a new one. As a result he invented a pendant provided with a separable cap portion adapted to screw down upon the ends of the bow and hold them securely in place as seen in the accompanying illustration. The removable section is provided with screw threads which

mate with spiral grooves in the pendant so that when a bow or cap becomes worn and loose the cap can be unscrewed, the bow removed and new parts substituted, thus saving much time and expense.

Article IV of International Convention of 1883.

By EXAMINER F. A. SEELY, U. S. Patent Office.

[Read Before the Patent Congress at Chicago.]

The international Convention of 1883 was the fruit of mature deliberation on the part of European Governments with the view to avoid or obviate the present injustice to inventors resulting from their laws. No criticism can be made of its beneficent purpose. Although in every case these laws propose to protect the inventor, yet by strained interpretations of language and by hard and narrow rulings they are made to deprive the inventor of the very protection to which they are pledged. This is particularly the case when the inventor is a foreigner, a subject or citizen of another country from that in which he desires a patent. The patent laws of Europe date from a period when nations were separated by hostile frontiers; but while the arts and advancing culture have to a great extent reduced the frontier to a mere political limit, and deprived it of its armed and hostile character, patent laws, the product and promoter of these arts and culture, have lagged far behind. The industrial arts never have known frontiers. They pass unchallenged over all natural and artificial boundaries, stopped not by barriers of mountain or stream or armed sentries. But in the view of patent laws a mechanical invention, outside the state of its origin, is an outlaw, its claim to protection in one country being destroyed by protection previously sought in another. This condition is produced by systems of law which hold, as in Great Britain, that the first to introduce an invention into the realm is constructively the inventor no matter how he may have obtained knowledge of it, or, as in France, that it is the invention that is to be protected rather than the inventor, or, as generally in Europe, that an invention once made known to the public in any country has no longer the quality of novelty, and therefore cannot be the exclusive property of any one, even of its inventor. But the inventor may for many reasons prefer to delay filing an application for patent in a foreign country. He may prefer to know his fate at home before going elsewhere, or he may wait to carry the invention to greater perfection before divulging it either at home or abroad. In either case he becomes the easy prey of any unscrupulous person who may obtain knowledge of it, and whose efforts to secure the legal right to it in other countries are facilitated by such laws as have been mentioned. These are in general to protect inventors, but often, as has been the experience of many, they create machinery for the discomfiture of the inventor.

This condition becoming more and more manifest, and with the advance of the arts a constantly increasing burden, set statesmen and publicists to thinking, and led to public informal conferences upon the subject in 1873 and 1878 in Vienna and Paris respectively.

Nothing but discussion was proposed in these conferences, since they had no official character; but discussion revealed clearly the need of some united action of the governments, and resulted in the appointment of a permanent commission to draft a treaty having for its object the creation of a union for the protection of industrial property, and to fix the general principles which should be uniformly applicable to such protection, and a request to the French Government to take the initiative in moving for a conference of representatives of the different nations. This conference was called for Nov. 1, 1880, and our government notified thereof by a communication from the French Minister at Washington to the Secretary of State on August 10th of that year, in which he enclosed the program of questions proposed for deliberation.

Except for the purpose of securing protection to Americans in foreign countries it is hard to see in what respect this program appealed to the government of the United States. Its salient features are mutual and reciprocal protection to the subjects of each state of the proposed union in all the others in respect to patents and trade marks and other industrial property, a broad proposition which commands universal assent. In respect to patents it further

proposed that the regular filing of an application in one state shall carry with it priority of registration in all the others during a period of Identical propositions were included with respect to trade marks and designs and industrial models, the term of priority being left open for future consideration in each case. This additional proposition was included respecting trade marks: "trade marks entered in one of the states of the union shall be guaranteed in all the other states, and property therein shall be considered as legitimately acquired by those who make usage of it conformably to the legislation of the country of origin."

Although the proposition concerning patents did not appeal to the United States, it is possible there was felt to be something for the advantage of our citizens in respect to trade marks, which may account for the representation of this government in the conference. It is noteworthy that the invitation to participate followed close on the heels of a memorial to the French Minister by a number of importing houses in New York regarding the necessity of some trade mark legislation in this country for the protection of French manufacturers whose goods they handled. This memorial was brought to the notice of the Secretary of State Nov. 26, 1879, by the French Minister, whose letter contained a suggestion that the Supreme Court decision declaring the law of 1870 unconstitutional, was at variance with the treaty between France and the United States of April 16, 1869, while the memorial itself urged the importance of congressional action for the protection of French interests. The question of a new trade mark law was then under consideration, and, pending its settlement and other action by Congress, the Secretary of State seems to have caught at the opportunity for a mutual understanding between the nations with respect to this kind of property, and the establishment of a new basis for legislation, and in his letter of Jan. 9, 1880, accepted the invitation. In this response Mr. Evarts referred to M. Outrey's statement that it was proposed to limit any international agreement that might be reached to such regulations as would not require serious modifications in the laws of the various countries, a matter apparently regarded as of great consequence at the time by all concerned, and obviously involving a clear exposition of the differences between the systems of different countries. Unfortunately this object was lost sight of at a latter stage when it should have been kept prominently to the front.

If it were not already known as a fact this correspondence would make it apparent, that, in considering the invitation of the French Government, no consultation was had with the Patent Office, the only bureau whose opinion on subjects relating to industrial property was worth having, whereby the fact could have been made plain that such a proposition as to determine priority of invention, and consequent patentability, by the date of filing an application in another country where patents are granted on principles so different from those which govern in the American system, could not possibly be entertained by the United States.

It was not the fashion in 1880 for the Department of State to seek the advice of other departments on any question of foreign relations. As late as 1890, I was gravely informed by a gentleman in public life, who formerly held a high position in the State department, that this would never be done. Fortunately times have already changed, and from a period not far from the beginning of President Cleveland's former administration all questions arising with foreign nations regarding patents and trade marks have been uniformly referred to the Secretary of the Interior for the consideration of the Commissioner of Patents.

Probably not much importance was attached to this business in 1880, and a spirit of complaisance towards the French Government may have been a prominent factor in the acceptance of the invitation. No effort appears to have been made to select as representatives of this government men who were qualified to participate in the discussion by their previous knowledge of patent or trade mark law. Mr. Evarts selected Mr. Noyes and Mr. Putnam, our

ministers to France and Belgium, informing them that their participation in the Congress was to be merely honorary. Only one of these gentlemen appears from the records of the Congress to have taken any part in its proceedings, and that a silent one. Mr. Putnam's presence day after day was absolutely without influence. The difference between the patent system of this country and those of Europe was not explained, and no effort was made, as originally proposed, to prevent the adoption of measures entirely incompatible with ours. In accordance with instructions Mr. Putnam insisted upon a reservation with respect to trade marks required by the existing state of federal legislation, and with that his active participation ended.

In the conference of 1880 some modifications were introduced into the various propositions considered, particularly into that providing for a period of priority, which constitutes the 4th Article of the Convention as finally agreed upon. This was adopted in the present form. (It must be observed that while all American discussion of this article, and of the whole convention, is necessarily based upon the English translation, yet, in any controversy that may arise regarding it, we and all other nations are held to the original French text, the only one that has an official character).

Article IV is in three paragraphs. The first provides that any applicant for a patent or for the registration of a trade mark in one state of the union shall enjoy a period of priority for the purpose of making the application in the other states. The second defines the effect of this period of priority to be that if a person, having filed his application for patent or registration in one country, shall, before the expiration of the period, file his application in another, the later application is not to be invalidated by anything that may occur in the interval, such as publication or public use or an application by another party. The third paragraph defines the limit of this period, which is to be for patents usually six months, but seven as between countries separated by the sea, these periods being abridged three months for trade marks and industrial models.

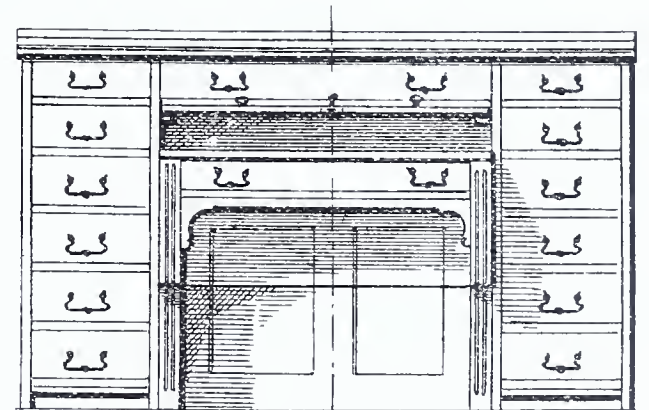
To those who are accustomed to regard patents and trade marks as involving clearly distinct rights, resting upon distinct principles, acquired by different means, and having a different tenure, it has always been a matter of surprise that an attempt should have been made to comprehend measures for their international protection in a single article of the convention. No objection was raised to this in the Congress, and the result has been to couple together countries in which a trade mark, as with us, is acquired by the single fact of adoption, and those in which the fact of registration is the sole foundation of the title, and by virtue of this to lead the courts of so liberal a country as Great Britain to virtually abandon the common law principle, and to reach the startling determination that an American has forfeited the right to protection in his trade mark through his failure to apply for its registration in that realm within four months from his application at home.

It being no part of this paper to consider the effect of the convention in respect to trade marks, that subject need not be continued. The remainder of the paper will be devoted to the effect of Article IV upon the rights of foreign applicants for patent in the United States and of Americans abroad. Apart from this article there is little of importance in the convention, since as an Italian delegate forcibly remarked in 1880, "it contains the whole convention."

[The conclusion of this paper will appear in the April number of this magazine.—Ed.]

Hopkins' Combination Desk.

The accompanying cut represents the combined sitting and standing desk patented by Archibald Hopkins, Esq., Clerk of the Court of Claims, as it appears when closed. A desk in which the open space



below the top of the standing desk, is utilized to receive an additional desk which, while contained within the compass of the standing desk, can be pulled out from the front whenever desired to be used as a sitting desk, thus making two complete desks in one piece of furniture.

SCIENCE FOR YOUNG PEOPLE.

Conducted by PROF. E. P. LEWIS.

Perhaps you like to spin tops. Did it ever occur to you that you could combine play and study, and learn many interesting things by watching the conduct of a top? Did you never wonder why it stands upright while it is spinning, or why a bicycle has no tendency to fall when it is moving rapidly? The top and the bicycle simply obey a great law of nature, and it is this law which enables Japanese jugglers to throw a top into the air, catch it as it falls on the point of a stick, make it travel up the stick to their shoulders, and do all sorts of marvelous things. You all perhaps remember how the great Sir Isaac Newton saw an apple fall from a tree, which suggested to him that perhaps the earth and the moon and all the planets are held in their orbits by the same force of attraction which makes the apple fall, and how he finally proved that this law of universal gravitation is true. It was Newton who also stated the "laws of motion" which tops and planets and all other bodies obey. One of these laws is that a moving body will move forever in a straight line if it is not acted on by any force. This seems like perpetual motion, which you have been told is impossible. But perpetual motion is only impossible for us because we can never keep the forces of the earth's attraction and of friction from stopping the body. Astronomy shows that there is perpetual motion in the solar system, because the earth and the other planets move through empty space, which offers no resistance. The property which causes a body to obey this law is called inertia. It is inertia which pitches you forward when you are standing in a car which suddenly stops; it is inertia which makes a stone move in a straight line when you release it from a sling, and which makes a top persist in spinning with its axis always pointing in one direction until friction and gravity have nearly destroyed its motion. This law is well shown by what is known as Foucault's pendulum. If you suspend a heavy metal ball by a long thread and set it swinging along a straight line you will find that in a few hours the direction of the line has apparently changed. It has not really done so though; the earth has turned around under it. There is an experiment by which you may greatly surprise any one who is not in the secret. Get a wheel of iron or some other heavy substance, and fasten it on an axle fixed on bearings inside of a closed wooden box. Set the wheel in rapid motion by wrapping a long string around the axle and quickly drawing it out of a hole in the box, just as you spin a top. Then tell the victim of the joke to pick up the box. He will be aware of nothing unusual until he tries to turn the box around. If the wheel is heavy and going very fast he will find it is not an easy thing to do, and might conclude that the box was bewitched. Inertia makes the wheel resist any efforts to change the direction of motion. For a similar reason a rifle shoots truer than a smooth-bore gun. The cork-screw shaped groove around the inside of the rifle makes a bullet revolve very rapidly, and this spinning motion causes it to go straight in the direction of its axis. Every one has heard about how Columbus could stand an egg on end by crushing one end flat. If Columbus had only played with tops in his youth he might have done the trick in an easier way than that, without hurting the egg. If you spin a hard boiled egg or an egg-shaped stone as it lies lengthwise it will at once try to rise up and spin around the longest line through it, for every particle in it will try to be as close to the axis as possible. This does not follow directly from the law of motion, but is due to friction. An unboiled egg does not do so well, for the friction of the moving liquid inside very soon destroys the motion. In fact, this is a very good way to find out whether an egg is hard or soft boiled.

All this shows there is very much to be learned from some toys. A top may tell us a great deal about the motion of the earth, which is nothing but a big top spinning around the sun, with its polar axis always trying to point in the same direction.

If this talk on tops has aroused your curiosity to know more about them it would be well to read a little book on "Spinning Tops" by Professor John Perry.

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Knock out one end of a wooden box and cover it tightly with a piece of cloth. In the opposite end cut a round hole about three inches in diameter. Set the box upside down over two saucers, one containing some strong ammonia and the other hydrochloric acid. The gases escaping from these liquids combine chemically, forming a dense cloud like smoke. Now tap the cloth side quickly. A smoke ring will be driven out of the hole, and will wriggle across the room. This ring is really of air, the smoke being carried with it and making its motion visible. If one of these smoke rings, or "vortex rings," follows close after another, it may contract and pass through the first, which will expand to give the second one plenty of room. Then the first one overtakes the second and goes through it, and this may be repeated until the friction of the air breaks the rings up. If these rings approach a solid object they will swell out as though trying to go around it, and they will rebound from each other like they were made of india rubber. It is impossible to cut one of these rings with a knife, for they absolutely refuse to be touched, wriggling away like slippery eels. You can make similar vortices by stirring a cup of coffee, or dripping ink into water. Helmholtz, the great German scientist, proved years ago that in a "perfect" fluid, that is, one in which there is no friction or viscosity, no vortex could be started by any force known to us, nor, if it were started, could we ever stop it, for there could be no friction to destroy the motion, and we never could get close enough to break it up by forcible means. This caused Sir William Thomson, (now Lord Kelvin), to advance a very beautiful theory as to the constitution of matter. He supposed that the atoms of matter are nothing else than little vortex rings in a perfect fluid, this perfect fluid being the ether through which waves of light, heat, and electricity travel. We have reason to believe that atoms are very elastic and are in constant motion, vibrating in all sorts of ways, and that they are indestructible in any way known to us. Lord Kelvin's theory fits the case better than any other, for we know that smoke rings move in exactly the right way to explain the conduct of atoms, and, as Helmholtz proved, a special act of creation would be necessary to make or destroy such atoms. Doesn't it make you feel rather queer to imagine that you are only a bundle of vortex rings spinning around in the ether, like whirlpools in a river?

* * *

If you hold a piece of sealing wax in a flame, the melting end becomes perfectly round. If you spill mercury on the floor it will break up into perfect little spheres. Water will do the same on a greasy surface, and rain drops are round. Why is this? It is due to what is known as surface tension. The molecules of a liquid lying on its surface attract each other and are attracted by the liquid inside. The result is just the same as though the liquid were enclosed in an elastic rubber bag. If there is not much liquid, so that its weight does not tend to flatten it out, this elastic skin will try to pull up into the smallest possible surface—and for a given volume the smallest possible surface is a sphere. This tendency is best shown by wax bubbles, where nothing is left but this elastic skin, holding a quantity of air under pressure. If you stick a needle in the bubble the air will escape and it will collapse, just like a balloon when its gas escapes. A liquid does not form round drops on a surface which it wets, such as water on clean glass, for in such a case the attraction of the solid for the liquid is greater than the surface tension of the liquid itself. This is why water rises in a small tube—a capillary tube. The attraction between the water and the glass pulls up some water, and the surface tension makes it drag more water with it. This explains also the rise of sap in trees and of oil in a lamp wick. Mercury does not wet any solid, and so forms drops, and does not rise in capillary tubes. Practical use is

made of this principle in manufacturing shot. The lead is melted and dropped through holes of the proper size. The drops become perfectly round and harden in that shape as they fall several hundred feet in the shot tower, and are received in a tank of oil and water which keeps them from being flattened by the fall.

The surface tension of water is weakened by grease, as you can prove by a very simple experiment. Sprinkle powdered sulphur or lycopodium powder on the surface of pure water. Grease a little stick ever so slightly and dip it into the water. The powder will fly away in all directions, leaving a clear round space around the stick. The grease diminishes the surface tension, so that the particles are pulled away in all directions by the greater surface tension elsewhere. It is just as though you stuck a hole in a sheet of stretched india rubber. The tension of the rubber in all directions would pull the hole out much larger than it was at first. The same thing is shown by particles of camphor in pure water. The water around the particles has its surface tension weakened by the camphor, and they are pulled hither and thither, dancing about like living creatures. You can make a greasy needle float on water. Being greasy, it does not break the elastic film, which holds it up. The same reason enables some insects to walk on water, and will enable you to perform the apparently impossible feat of carrying water in a sieve, or making it float on water. You have only to grease the wires of the sieve thoroughly, and it will hold water without spilling a drop, if you do not put in so much water that its weight breaks through the elastic "skin" that holds it up. A drop of oil on water will be pulled out by the tension in a very thin film.

Power in Nature.

Nothing in Nature is more manifest than power. The world is full of it. Even the air above us and the waters of river and ocean abound in power. The sun light quickens the growth of tree and shrub and flower. The tide wave rolls forever on the beach. The power already exerted by Niagara is incalculable. The volcano is appalling, and the cyclone is irresistible. There is power in gravitation. Power in expansion and contraction. Power in steam, electricity, and chemical action. Everywhere and on every hand nature is full of power.

For many centuries men have been slow to avail themselves of the power of nature. The steam engine was always possible; but no one knew how to apply the principles of steam to man's service. The lightning for centuries has flashed, during stormy summer nights, like a great electric light in the heavens; but no one knew how to control the electric power. Waterfalls have been running since the creation, but the power was lost until man applied the water wheel to turn the wheels of the mill.

During the centuries past, human muscles have supplied the greater part of the power required to do the world's work. As civilization advanced, beasts of burden were more extensively used. But it is only in comparatively recent times that the powers of nature have been subjugated and freely used in man's service.

Men would doubtless always have used these forces of nature if they could only have had the "know how."

E. L. ARNOTT.

Patent Office Investigation.

The Washington *Post* of February 19, publishes a three column article over the signature of William E. Curtis, charging irregularities in the affairs of the Patent Office and connecting the names of Josiah Quincy, late Assistant Secretary of State, the Commissioner of Patents and other prominent officials, with the letting of the contract for printing the "Official Patent Office Gazette."

The Gazette is an official publication published weekly by the Patent Office, and contains photo-lithographic cuts of every patent granted, together with an explanation of the claims set forth in the application of the inventor. This work had formerly been done by the Norris Peters Photo Lithographic Company, during a period of nearly 25 years.

About the first of June last the Norris-Peters Company, received a communication from the Commissioner of Patents asking if some reduction could not be made in the cost of the publication, and was answered by Mr. Frazier, that he did not see his way clear to make such reduction, because of the high class of work furnished which required the employment of artisans of rare skill, and the use of most expensive material. A week later the Norris Peters Company received notice, requiring it to furnish a bid for the printing of the "Official Patent Office Gazette" for the fiscal year, beginning July 1st, 1893, requiring an answer by June 15, being a little less than 24 hours from the time he received the notice requiring the bid. There were but two bids submitted, that of the Norris Peters Company, and the National Lithographing Company, of Washington.

The article charges collusion between the Company, Josiah Quincy and the Commissioner of Patents. Based upon this article Senator Hale of Maine, presented a resolution in the United States Senate, which was adopted, instructing the Committee on Printing to examine into all the facts and circumstances connected with the contract of the National Lithographing Company, for the publication of the Gazette. A committee, consisting of Senators Gorman of Maryland, Manderson of Nebraska, and Ransom, of North Carolina, has held two sessions, and taken, in part, the testimony of Commissioner Seymour. Mr. Quincy was before the Committee, but did not testify. He is expected to testify later. The result of this investigation will be awaited with interest by all persons interested in the business of the Patent Office.

NEWS CONDENSED.

FEB. 1.—The Wilson tariff bill passed the House by a vote of 204 to 104. Seventeen democrats voted with the republicans against the bill. Bids aggregating \$58,000,000 for \$50,000,000 of new 5 per cent. government bonds were opened in Washington, the prices ranging from 117.225 to 120.828. French Chamber of Deputies passes a vote of confidence in the navy.

FEB. 2.—H. H. Wheeler, president of the American District Telegraph Co., died in Brooklyn of quick consumption. Parnellites issue a manifesto declaring the Liberal government's rule in Ireland a failure. King Behauzin, of Dahomey, surrenders to the French.

FEB. 3.—Prof. Edward Fremy, celebrated French chemist, died. George W. Childs, philanthropist and editor Philadelphia *Public Ledger* died, aged 64.

FEB. 4.—Morton S. Wilkinson, United States Senator from 1859 to 1865, died at his home in Wells, Minn., aged 75. Rumor afloat that Mr. Gladstone will soon retire from office.

FEB. 5.—Decision in South Carolina "Palmetto" Trade Mark case was reversed by Court of Appeals; right of Commissioner of Patents to refuse registration upheld. Work on New York's new speedway to cost \$630,000, begun. Republicans win in New York senate and Mr. Wolfert of Sixth district officially recognized. Ex-Congressman A. H. Buckner died at Mexico, Mo. New Orleans carnival begun.

FEB. 6.—Ex-President Harrison denies that he is about to wed the widow of Leland Stanford. Gen. Jacob Ammon dies at his home in Lockwood, Ohio, aged 88. National Wool Growers' Association meets in Washington to protest against the free wool schedule in the proposed new tariff bill.

FEB. 7.—Fire at Montgomery, Mo., destroyed seventeen store buildings; loss \$125,000. Moody and Sankey, evangelists, open a four weeks' revival in Washington.

FEB. 8.—President Cleveland signed the bill repealing the Federal elections law. Reuben T. Kolb was nominated for governor of Alabama by the Populists. The warship Kearsage was wrecked on Roncador reef in the Caribbean Sea on February 2; officers and crew saved.

FEB. 9.—Congressman Houk drops dead in Washington of heart failure. Maxime du Camp, well-known author, died in Paris. General Lucius B. Northrop, commissary general of the Confederate army, died in Baltimore. A plot was discovered to assassinate President Peixoto of Brazil.

FEB. 10.—Another attempt made by incendiaries to burn World's Fair buildings. Samuel Foreman, said to be the oldest Odd Fellow in the United States, died at Greenburg, Ill. The receivers and employees of the Northern Pacific railroad came to an agreement and the threatened strike is abandoned. Love's Tannery at Sandbank, N. J., burned; loss \$125,000. The Russo-German treaty signed by representatives of both nations at Berlin. Death of King Lobengula reported from Cape Town, Africa.

FEB. 11.—Colt's Fire Arms Manufacturing plant at Hartford, Conn., partially destroyed by fire; loss \$250,000. Tobacco factories of R. H. Roper and Barrett & Co., Henderson, Ky., burned with 700,000 pounds of tobacco; loss \$180,000.

FEB. 12.—Crew of the stranded steamship Kearsage are rescued; only one was lost. The trial of fifty-eight coal mine rioters begins at Pittsburgh. Dr. Herston Quincy Butterfield, President of Olivet College, died at Olivet, Mich., of pneumonia. Mr. Gladstone announces that he will again appeal to the country.

FEB. 13.—Hans von Bulow, distinguished German pianist, died in Cairo, Egypt. Thirteen men entombed by mine cave-in at Gaylord coal mine, near Kingston. The Bath Iron Works at Bath, Me., loss \$175,000. Many lives lost in a blizzard in Oklahoma and Indian Territory. Storm on Atlantic coast the severest since 1888. Decision is rendered by the Commission in the Itata case against the United States, the damages for unjustifiable seizure being placed at \$235,000.

FEB. 14.—Still another attempt made to burn the World's Fair buildings, in view of which the South Park commissioners decide to sell the buildings to the highest bidder. Brigadier General Hinks, first volunteer of the war, died at home in Cambridge, Mass. Mrs. Myra Bradwell, editor of *Legal News*, Chicago, and first woman lawyer in Illinois, died, aged 63. Oil warehouse and mills of P. H. Preston & Co., Newark, N. J., burned with \$200,000 worth of linseed oil.

FEB. 15.—President Dole's reply to Minister Willis is made public. New York State Normal and Training School at Oneonta, burned; loss \$200,000. Jacques Lavalley, the French sculptor, died at Chassy. John Y. McKane, the Gravesend political "boss," was convicted of violating the election laws.

FEB. 16.—Wheeler H. Peckham, of New York, nominated for associate justice of the United States, rejected by the senate by a vote of 41 to 32—15 democrats, 24 republicans and 2 populists voting against, and 23 democrats, 15 republicans and 1 populist voting for the confirmation. American steamer Paris loses her rudder 750 miles out and returns to Queenstown for repairs. Train robbers attack a Southern Pacific express at Roscoe station at 1 o'clock, a. m., ditch the engine, blow open the express safe, kill the fireman and another man, wound the engineer and get away with about \$1,000. Secretary Morton burned in effigy by disgruntled Nebraska City democrats. Main building and annex of Knoxville College, at Knoxville, Tenn., burned with library of 2,800 volumes; loss \$45,000. Strike of employes resulted in closing down of all the leading silk manufactories in New York city. Yellow fever reported on the increase in Rio Janeiro. Explosion of boilers on German cruiser, Brandenburg, at Kiel, killed forty-one men and injured many others.

FEB. 17.—Of the fifty-eight Mansfield rioters on trial at Pittsburgh, thirty-two were found guilty. In urgent advances and victories reported from Rio.

FEB. 18.—News of the wreck of tug Millard, belonging to Nicaragua Navigation Company, off Nicaragua coast, with sixty men, and all lost, confirmed. Another attempt to burn World's Fair buildings—small blaze in Illinois state building. All the mines in the Massillon district, Ohio, closed on account of refusal of the miners to accede to terms offered by the operators. Griswold Linseed Oil Mill, at Warren, Ohio, burned; loss \$150,000.

FEB. 19.—John Y. McKane, convicted of violation of the election laws at Gravesend, L. I., sentenced to six years in Sing Sing. U. S. Senator E. D. White, of Louisiana, nominated for Associate Justice of the U. S. Supreme Court, and confirmed. Deaths from yellow fever at Rio Janeiro average sixty daily. Joseph Keppler, the caricaturist of *Puck*, died in New York.

FEB. 20.—Galusha A. Grow, republican, elected Congressman-at-large in Pennsylvania by over 180,000 majority. The tin can japanned ware factory of Norton Brothers, Chicago, burned; loss \$600,000; 600 men thrown out of employment. Blizzard in Kansas caused great loss of cattle on ranges.

FEB. 21.—Vessels of all nations seek the protection of the American flag in the harbor of Rio Janeiro. Erastus Wiman, indicted by New York grand jury for forgeries amounting to \$229,000. Officers and crew of wrecked steamer Kearsage arrive in New York. Gen. Fitzhugh Lee declines the diplomatic post of minister to Stockholm. Ex-Minister Phelps reported quite ill in New Haven, Conn.

FEB. 22.—Governor McKinley received an ovation in Chicago. The Guatemala government announces a suspension of

payment of her debts. Rhode Island prohibitionists nominate a complete state ticket headed with Henry B. Metcalf for governor.

FEB. 23.—The House of Lords reverses its former action and favors the Parish Council bills. American Publishers' Association elected James W. Scott, of Chicago *Herald*, president.

FEB. 24.—Norman Munro, the veteran publisher, died in New York. Michigan's state officials were indicted for felony. Judge Brentano refuses a new trial for Prendergast, the murderer of Mayor Harrison, of Chicago, and fixes March 23 as the date of his execution. A gigantic trust in manufacturers of steel castings is announced. The dome of the Agricultural building, World's Fair grounds, burned; incendiary. The Bond Brook Standard Print Company's Works at Somerville, N. J., burned; loss \$200,000.

FEB. 25.—Blizzard of unusual severity strikes Washington and extends all along the Atlantic coast. Steele Mackaye, the author and dramatist, died on the train en route to San Diego, Cal. The insurgent warship, Aquidaban, runs the gauntlet of the government forts at Rio Janeiro and is not disabled. The insurgent steamer Jupiter, was sunk by the dynamite cruiser Nitheoy. The mining town of Kaslo, B. C., burns; loss \$200,000.

FEB. 26.—The Attorney General renders an opinion that silver certificates are not lawful money. Congressman Wilson reported dangerously ill in Guadalajara, Mexico, where he went in search of health. The senate committee report on the Hawaiian investigation, while justifying the President's motives mildly, question his judgment. Queen Lilioukalana is the only person censured. Ex-President Harrison left for the Pacific coast on a lecturing tour.

FEB. 27.—Ex-President Harrison receives an ovation all along the line en route to California. It is again announced that Mr. Gladstone will resign. Boston idle laboring men make an orderly demonstration. The seventeenth annual session of the National Electric Light Association meets in Washington.

History of the World's Fair—Notes.

Hon. John Boyd Thacher, Chairman of the Executive Committee on Awards, and Prof. O. V. Tousley, National Commissioner from Minnesota, have been selected as the gentlemen to compile the history of the World's Fair. The history will comprise the report of the Director-General of the Exposition, and the President of the Columbian Commission, and the heads of the different departments, essays by expert judges and valuable records and educational features of the great exhibition contained in the thousands of reports made by the International Committees of Judges. Prof. Tousley's portion of the literary work will relate more particularly to the statistical and historical features of the preparation and conduct of the Fair, while Mr. Thacher will be confined to the examination and reports upon exhibits by judges. It is thought the work will cover about thirty volumes of perhaps six or seven hundred pages each, and that the compilation will be completed within a year. The Board of Lady Managers and the Department of Awards are the only two branches of the Columbian Commission which did not exhaust their appropriations. These two departments have about \$120,000 still to their credit, and it is presumed that this fund will be used in completing the history of the Exhibition.

Some idea of the amount of foreign goods and wares sold at the Exposition can be gained from the statement that foreign exhibitors, up to January 30, had paid the government \$835,384 in duties. These exhibitors had then shipped from the grounds nearly 50,000 packages and 20,000 yet remained unprepared for custom inspection.

The Bureau of Awards is sending forth hundreds of official copies of awards granted at the Exhibition. This course is pursued to enable successful exhibitors to learn in advance what will be the wording on their diplomas. It is said that the entire work of issuing these advance sheets and completing the records of this department will be completed by the first of June, and then will follow the actual printing of the findings of the individual judges in the diploma form, which is now being executed at the bureau of engraving and printing under the direction of the Secretary of the Treasury. It will be necessary to compose a separate type form for each diploma. There were more than 23,000 successful exhibitors at the Fair, and as a number of these received awards in different groups some 27,000 diplomas must be printed.

Although not officially so announced it is generally understood that Mr. St. Gaudens has decided to drape the objectionable features of the male figure on the reverse side of the World's Fair medal, or if this is not satisfactory he will make an entirely new figure of a robust young man as typical of America. The medal will be struck off at the Philadelphia mint as soon as the proposed changes have been made and the new die is cut.

California Excursions.

The well known Phillips Excursion Company have arranged to run weekly excursions to all principal California and other Pacific Coast cities from all points on the Baltimore & Ohio R. R. The parties will leave the East on Wednesday of each week, commencing January 17th, and passengers will be booked through to destination. There are no Pacific Coast tours offering as good accommodations at less expense. For full information address A. Phillips & Co., No. 111 S. 9th Street, Philadelphia, or call on nearest ticket agent B. & O. R. R. Co.

Books and Magazines.

The Appletons will shortly publish Mr. L. S. Mac Jay's exhaustive "History of the United States Navy," the author has been at work for five years.

The Bancroft Company, Auditorium Building, Chicago, is engaged in a work deserving of more than a passing notice, the reproduction in book form in the highest quality of the entire Exposition. In *The Book of the Fair*, the great panorama will come from the past into the present in logical and historical order. The reader will see the foundations upon which previous fairs were based, broadened, and like some magical plant the various seedling of the ideas which are at the base of the Columbian Exposition. Having introduced this latest and greatest of world's fairs, the book will trace its evolution in all details, show how it was built, and who were its chief founders, and then picture it not only in its general but in its special features.

"The Patent Salesman's Guide" is the title of a highly interesting and instructive book by H. O. Harper, of Kinston, North Carolina. It contains just such information as inventors are seeking—advice regarding patents, how to secure them and what to do with them after they are secured.

The *National Geographic Magazine* for February, contains the annual address of President Gardiner G. Hubbard, on "Geographic Progress of Civilization." This paper was read before the meeting of the National Geographic Society, February 2. The author illustrates by the indelible "footprints of time in history" that the higher civilization of mankind has developed between parallels of latitude drawn around the earth about fifteen degrees north and fifteen degrees south of Washington. "The land within these parallels would include all the countries of the world that have been highly civilized and distinguished for art and science," says the writer, "and the nearer man lives to the polar regions the greater his infirmity in intellect, the greater the barbarism." After reciting the progress of civilization the distinguished author closes his paper with the following significant prediction: "We began with the proposition that in all ages of the past civilization has been confined to the favored regions lying in the temperate zone; but with ever increasing knowledge there seems to be no reason to doubt that man will eventually bring under subjection all the adverse conditions of physical life and become the master of his environment, until the whole earth, even those regions heretofore supposed to be entirely unfit for habitation, shall own his power and become the abode of the highest intelligence and greatest civilization."

"Progress" is the significant name of a new weekly publication in Washington devoted to the advertising and business interests of the Capital. W. A. Hungerford is the editor and G. Grant Armor manager.

The *Electrical World* in its new form, published by the W. J. Johnston Co., New York, is a handsome publication. It is in the front rank of electrical journals.

The *Hardware Dealer* is the name of a new monthly trade paper published by D. T. Mallett at 78 Reade street, New York. It contains ideas and information for hardware dealers, and the excellence of its reading matter is only equaled by the beauty of its typographical appearance.

The *Irrigation Age*, Chicago, a magazine of great interest to the residents of the arid regions in the West, has changed its form and broadened its field. "The Progress of Western America" is an interesting article in the January number.

"Directory of Scientific Societies of Washington" has been received. It contains the names of active members of the Anthropological, Biological, Chemical, Entomological, Geological, National Geographic and Philosophical Societies. The directory is published under the auspices of the Joint Commission; Marcus Baker, Secretary.

In *American Engineer and Railroad Journal* for February appears an article on the Buffington-Crozier Disappearing Gun Carriage, finely illustrated.

"Quarterly Boiler Review"—Two quarters, October and January, received. Delay in issue of October number explained as having been permitted in order to afford time to thoroughly secure the numerous claims which are involved in the design and construction of the Hogan boiler in the domestic and foreign patents. While this magazine is more particularly designed to set forth the advantages of the Hogan steam boiler and affords a medium for the dissemination of Mr. Hogan's views regarding boiler circulation, etc., it is nevertheless, a very interesting publication for those engaged in the operation of steam boilers of every kind.

Town Topics, the well known weekly, famed for the brightness and boldness of its writings, begins 1894 a more breezy publication than ever, and with a most interesting new feature added. It will, hereafter with each number, issue, as a loose supplement, a portrait, drawn from life by its own special artists, of some man particularly distinguished at the moment in his walk of life. These portraits will not be reproductions of photographs or an ordinary portrait for which the subject has posed, but will be an exact and life-like picture of the man in his natural or characteristic attitude. As every one knows, the stories, literary notes, poetry, jokes, field sports and turf notes, are all by the cleverest writers of the day. In fact no one, as yet, ever discovered a dull line in *Town Topics*. \$4.00 per year; trial subscription, three months, \$1.00. *Town Topics*, 21 West 23d Street, New York.

Who are the most famous writers and artists of both continents? *The Cosmopolitan Magazine* is endeavoring to answer this inquiry by printing a list from month to month—in its contents pages. This magazine claims that notwithstanding its extraordinary reduction in price, it is bringing the most famous writers and artists of Europe and America to interest its readers.

SMALL TALKS ABOUT BUSINESS. By A. E. Rice; Fremont, Ohio; Fremont Publishing Co.; cloth, 75 cents; paper, 40 cents.

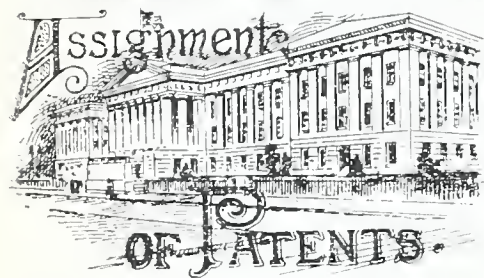
The author of this little work writes from knowledge gained by many years experience behind the bank counter. It is in fact "A Banker's Hints for Men and Women." It is thoroughly practical, telling in a plain way just what people want to know concerning every day business affairs. Valuable to young business men and women, it also contains important suggestions to those of mature experience in the business world.

"Tips to Inventors."

This is one of the most instructive and useful works for mechanics and inventors. Its author is Robert Grimshaw, M. E., and the book, cloth bound, retails for \$1. The *INVENTIVE AGE* for one year and "Tips to Inventors" will be sent to any address for \$1.50.

POPULAR SCIENTIFIC BOOKS.

The A B C of Electricity, by W. H. Meadowcroft. Dynamo and Electric Motors, illustrated, by Trevert. Practical Treatise on Electro-plating, by same. Practical Treatise on the Incandescent Lamp, by Randall. Alternate Current Machinery, by Gilbert Kapp. Steam Boiler Explosions, by Zerah Colburn. Ventilation of Buildings, by W. F. Butler; edited and enlarged by J. L. Greenleaf. On the Designing and Construction of Storage Reservoirs, by Arthur Jacob, A. B. A Treatise on the Compound Engine, by John Turnbull, Jr.; with additions by Prof. S. W. Robinson. Safety Valves, by Richard H. Buel, C. E. A Practical Treatise on the Teeth of Wheels, with the Theory of the use of Robinson's Odontograph, by Prof. S. W. Robinson. On Transmission of Power by Wire Ropes, by Albert W. Stahl. Terrestrial Magnetism of Iron Ships, by Prof. Fairman Rogers. Cable Making for Suspension Bridges, as exemplified in the construction of the East River Bridge, by Wilhelm Hildenbrand, C. E. A Hand-book of the Electro-magnetic Telegraph, by A. E. Loring, a Practical Telegrapher. Transmission of Power by Compressed Air, by Robert Zahner, M. E. Turbine Wheels, by Prof. W. P. Trowbridge. The Telescope: its Construction, etc., by Thomas Nolan. Induction Coils: How Made and How Used. The Theory of the Gas Engine, by Dugald Clark. Electro-magnets, by Th. du Moncel. Dynamo-electric Machinery, by S. P. Thompson. Dynamo Electricity, by John Hopkinson, J. A. Schoolbred and R. E. Day. Recent Progress in Dynamo-electric Machines, being a Supplement to Dynamo-Electric Machinery, by Prof. Silvanus P. Thompson. The Steam Engine Indicator and its Use, by W. B. Levan. Hand-book of Mineralogy; Determination and Description of Minerals found in the United States, by Prof. J. C. Foye. Modern Gun Cotton: Its Manufacture, Properties and Analysis, by Lt. John P. Wisser, U. S. A. "The Inventor's Friend," by Joseph Allen Minturn.



Under this heading is published all assignments of patents or partial interest in same, as on record in the United States Patent Office for the month ending February 24, where the consideration was \$2,000 and over.

North Dowling inventor, to the American Standard Telephone Co., of New Jersey, Diaphragms for Telephone Receivers; all rights for the U. S. \$10,000.

Isaac N. Darr inventor, to Scott F. Keller of Monticello, Ill., harness; all rights for the U. S. \$2,000.

Daniel D. Frisbie inventor, to A. A. Voorhis of Pontiac, Mich., Fence; all rights for three states, \$5,000.

Erdman Rank inventor, to Charles H. Jacobs, Chicago, Ill., Fire Escapes; undivided interest for the U. S. \$5,000.

Lee J. Rogers inventor, to M. G. Rogers, Pomona, Cal., Plum Levels; all rights, \$5,000.

James M. King inventor, John W. Mundenhall assignor, to the King Press Drill Co., of Thayer Co., Neb., Seed Planter; all rights for the U. S. \$35,000.

Lester B. Kennedy inventor, Matthew S. Porter, assignor, to Bernard Corrigan, of Jackson Co., Mo., Car Couplers; all rights for the U. S. \$10,000.

Charles Kelley inventor, to Clarence M. Kemp of Baltimore, Combined Air Trap and Seat for Privy Vaults; all rights for the District of Columbia, \$5,000.

Henry O. Price inventor, to Price's Medical Co., of Chicago, Ill., Trade Mark for Medicine for Rheumatism, Gout and Lumbago. All rights for U. S. \$5,000.

Edward E. Poole inventor, to the Fordyce Nutt Lock Co., of Fordyce, Ark., Nutt Locks; all rights for the U. S. \$10,000.

Charles E. Schofield inventor, to James H. McAllister, of Holt Co., Neb., Window Screens; all rights for the State of Neb. \$3,000.

James T. Smith and Oliver T. Lucas inventors, to J. T. Smith, of Shaw, Kans., Wire Splicer; all rights for U. S. \$10,000.

Theodore Schulz and Frederick A. Cody inventors, The American Automatic Lighting Co., assignors, to Francis M. Doyle, of Chicago, Ill., Hydrocarbon Lighting Device; all rights for the State of Wis. \$25,000.

Elijah Neff inventor, to Alonzo L. Rennells, of Rochester, Ind., Pump for Water Systems; undivided interest, \$10,000.

Edmund P. Baxille inventor, to Louis C. Granger, of Tenafly, N. J., Machine for Treading Screws; all rights for the U. S. \$4,000.

John H. Brower inventor, H. H. Russell, assignor, to W. W. Flagg, Waupun, Wis., Wire Fence Stays; undivided interest, \$6,000.

Charles O. and Lucien Barnes inventors F. J. Miller, assignor, to the Barnes Car Coupler Co., Car Coupling; all interest in said invention, \$1,000,000.

Benjamin F. Smith inventor, to Edward P. Johnson and George T. McElroy, Hame Fastener; all rights for Minn. and Wis. \$4,200.

Thomas Head inventor, Edward Ore and George W. Haight, assignors, to James A. DeLaney, of Grafton, No. Dakota, Graining Composition; all rights for Vermont and R. I. \$3,500.

Samuel F. Hawley inventor, to George S. Henning, Humboldt, Tenn., Clothes Washer; all rights for the U. S. \$10,000.

Augustus R. Hynson inventor, to Montrose P. Hynson, of St. Louis, Mo., Barrel Heaters; all rights for U. S. \$5,000.

James A. Currie inventor, Frank E. Robinson, assignor, to the Huhn Co., of Vigo Co., Ind., Mfg., of Hominy Flakes, or Corn Flakes; all rights for the U. S. \$8,000.

Matthew F. Connett inventor, to the Bayou City Fence Machine Co., of Houston, Texas; Picket Wiring Fence Machine Co., all rights for five states, \$5,000.

Charles J. Clark inventor, to John G. Hess, of Hagerstown, Md., Tires for Vehicle Wheels; all rights for four states, \$2,000.

William T. and John D. Calton, inventors, to John S. Thompson, of Cleveland Co., N. C., Cultivators; undivided interest, \$5,000.

The Industrial World.

Car works at St. Louis, Mo., have resumed.

The silk ribbon factory at Egg Harbor, N. J., has resumed.

The Aetna Hosiery Mill at Lansingburg has resumed operation.

Dunlap's Hat Factory at Brooklyn is again in active operation.

The striking potters at Wellsville, Ohio, won. Old wages restored.

Business in Grand Rapids, Mich., furniture factories is improving.

The Edison Electric Works at Schenectady have started up on full time.

The New York banks held \$74,767,500 in excess of legal reserve on February 24.

A general improvement is noted in the lumber trade, particularly in the South.

Croft, Sons & Co., extensive worsted mills at Camden, N. J., have started up again.

Nearly all the knitting mills at Cohoes, N. Y., have resumed operations on full time.

The Tarentum Plate Glass Works, idle since June last, have started again on full time.

The Scranton Pa., Lace Factory has started up on an order for 30,000 pairs of lace curtains.

The Standard Silk Company's mill at Tobyhanna, Pa., has resumed active operations.

Five of the six Wamsutta Mills at New Bedford, Mass., have arranged to resume at once.

A reduction of wages is announced in the Westinghouse Machine Works at Pittsburg, Pa.

The puddlers have accepted the \$4 rate at National Rolling Mill Co.'s McKeesport, Pa., plant.

After an idleness of two years the Clifton Iron Works, at Birmingham, Ala., have resumed.

The Leodon Carpet Mills at Bristol, Pa., are again in operation with half the regular force at work.

Another cut of 25 per cent. in wages has taken effect in Latrobe Steel Co.'s plant at Greensburg, Pa.

Rock Woolen Mills at Rockville, Conn., will shut down soon, throwing 400 hands out of employment.

The Roxborough Carpet Mills at Plymouth, Pa., are again in operation, giving employment to 1150 hands.

Business in Detroit manufactories is picking up. The Detroit Safe Co. is running full force night and day.

It is reported that the American Brass Works will shortly move from Cambridge, Mass., to Valparaiso, Ind.

A reduction of 10 per cent. in wages has gone into effect in the Pepperell and Laconia Mills at Biddeford, Me.

The tobacco firm of Wm. Eggert & Co., Cincinnati and New York, has asked for extensions from its creditors.

The Hartford Carpet Company has reduced wages 10 to 20 per cent., and increased working hours to 40 per week.

In all the shops along the Philadelphia and Reading Railroad a reduction in wages of 10 per cent. is announced.

The Old Town Woolen Mills shut down on the first of February, first time in five years, owing to lack of orders.

The Pontoosne Woolen Mill at Pittsfield, Mass., has started up on full time, with 15 per cent. reduction in wages.

The Bethlehem Iron Company's steel mill at Bethlehem, Pa., will resume March 4, giving employment to 1,200 men.

The Keystone mill of Lindsay & McCutcheon, Pittsburg, has resumed under a 10 per cent. reduction in finishers' wages.

The Bigelow Carpet Mills at Clinton, Mass., have resumed with reduction in wages amounting, it is said, to 15 per cent.

It is reported that a reduction of 5 to 10 per cent. has been made in wages at the Washington Mills, Lawrence, Mass.

Ellis & Son and Messrs. Reynolds have started their woolen mills at Monson, Mass., on full time, with wages reduced 12½ per cent.

Stevens & Co.'s woolen mills at Haverhill, Mass., started up on full time Feb. 5. Also Roy's mills at North Beltingham, Mass.

It is stated that the Bound Brook Woolen Mill at Bound Brook, N. J., is operating full time with a cut of 20 per cent. in wages.

A reduction of 10 per cent. has been made in wages in the Halle & Frost Woolen Mill at Hinsdale, N. H., and the plant is operating on full time.

At the meeting of the Iron and Steel Sheet Manufacturers' Association, at Pittsburg, on the 13th ult, it was agreed that the wages of high-priced men must stand a heavy cut on the

taking effect of the Wilson bill, probably as much as 40 per cent., while other workmen would in all likelihood be cut 20 to 25 per cent.

A reduction in wages amounting to 5 per cent. on common and 10 per cent. on skilled workmen has taken effect at Jones & Laughlin's mills at Pittsburg.

General business revival is reported at Racine, Wis. The J. I. Case Thrashing Machine Works and several smaller manufactories have resumed operations.

Important Decisions.

Judge Rickes, holding court at Cleveland, Ohio, has rendered a very important decision relating to the validity of a patent in the Buckeye lamp case, in which he holds that the Edison lamp patent is void as to the Buckeye Electric Co. The case in point is made to apply specifically to the Buckeye suit; the principle, involved, however, is much more far-reaching in its application to patents generally, which is that inventors are bound by the date endorsed on the patent and although such endorsement may have been made by error (as was the fact in the case in point) still persons acting in good faith on such endorsement and investing capital in consequence of the supposition that the patent expired at the date endorsed, can not be proceeded against for infringement. The court in this case also decides that the dedication of a patent to the public, when made, becomes absolute, irrespective of the time the patent has yet to run and that such dedication can never be subsequently revoked. By this decision it is held that all persons securing patents are bound by the date endorsed on the patent even though such endorsement may not have been necessary and no inquiry is necessary on behalf of the public in the face of such endorsement. Therefore, the services of both careful and competent persons is necessary and valuable in securing patents.

An interesting question has been raised in the Circuit Court of the District of Columbia by H. H. Jones, who has brought mandamus proceedings against the Commissioner of Patents, and which involves the right of the Commissioner to reverse the decision of his predecessor on the same state of facts. There is also pending another case which is to determine whether the Commissioner can reverse the favorable action of the principal examiner in allowing applications. Within the past month 600 applications have been withheld from issue, and either rejected or held for further examination. The decision in the case will be awaited with interest by every patent attorney.

Proposed Changes in Patent Laws.

Senator Palmer of Illinois, has introduced a bill which has for its purpose the shortening of the terms of patents in certain cases. It provides that inventors may obtain two or more patents, upon unusual proceedings, whether the invention be capable of division mechanically or on physical lines, or the application differ merely in the form of scope of claims presented; provided that all such patents shall be issued on the same day, or if not so issued, each of the later ones shall be issued only for the unexpired portion of the term of the first one granted, so as to cause them all to expire together. Purchasers under any such patents shall not be required to pay royalty under the others or any of them. The issuance of two or more patents to the same inventor containing the same claims is prohibited.

A delegation chosen by the American Association of Manufacturers and Inventors was heard by the House committee on patents recently, as to comprehensive changes in the patent laws. Messrs. Arthur Steuart, of Baltimore, George Harding of Philadelphia and W. C. Dodge of Washington, explained the proposed changes, which have been embodied in a bill introduced by Representative Hall of Minnesota.

A bill has been introduced by Representative Robbins of Alabama, for a commission to be appointed by the President to revise the laws concerning patents and trade marks.

The Perfect Copy-Holder.

The Perfect Copy-Holder, the invention of Capt. J. C. Mitchell, is now being sold by the Perfect Copy-Holder Co., Washington, a corporation organized under the laws of Virginia. The popularity of the holder seems to be assured as it is the only adjustable, movable and practical holder ever made. It is being used quite extensively in the departments, and by typewriters generally.

Commissioner of Patents Seymour has issued a circular announcing that hereafter on Wednesdays he or the assistant Commissioner will give oral hearings on questions of classification of applications or patents to examiners whose divisions may be involved. No written statements on these questions will be received.



The infringement on the phonograph and graphophone patents has been decided in England in favor of the Edison-Bell Phonograph Co., on all points.

An ordinance has been presented to the Philadelphia council for an elevated electric railroad eight miles long.

The Northwestern Electrical Association held an interesting and profitable meeting in Milwaukee, Feb. 18th and 19th. The summer meeting will be held at St. Paul.

The death of Dr. Colton of New York, inventor of the first electric locomotive, occurred on Jan. 16th. He was also celebrated as the discoverer of "laughing gas," for dentistry.

Electricity will probably be the motive power for the new North Side elevated railroad in Chicago. The road is to be twelve miles long, six miles to be completed within three years.

The suit for injunction brought by the Bell Telephone Company against the Western Telephone Construction Company has been compromised and dismissed; the Bell Company pay the cost of suit.

The Bell Telephone Company has made application to the Massachusetts legislature for authority to increase its capital \$30,000,000. The larger portion of this increase is designed for extension of its long distance telephone system.

One of the first consumers of electricity generated by the Niagara Falls plant will be the Pittsburg Reduction Company, which will employ a current equal to about 3000-horse power in producing aluminum by electrolysis. This work will be done near the falls.

There is pending in Congress a bill authorizing the Metropolitan Railroad Company of Washington, to put in a system of underground electric trolley on its 9th street line, with privilege of using cable if found to be more practical. The success of the underground conduit electric system on the U street line encourages the belief that this system will be adopted on the 9th street line.

The Westinghouse Electric Works at Pittsburg are doing a business of nearly \$6,000,000 per year, are employing more than 2000 hands, and have contracted for a new plant with all modern improvements. The company shipped upwards of \$500,000 worth of goods in November and nearly \$600,000 worth in December. It will be obliged to work nights in order to complete the Niagara Falls apparatus on time.

The Railroad Commissioners of New York finding there must be special legislation to allow them to take the position of judges in the contest for the prize of \$50,000 offered by the Metropolitan Traction Company, of New York City, for the best method of transit in city streets other than the trolley and cable, are preparing an enabling measure to be presented to the Legislature at Albany for its action.

In the suit now pending between the Adams Electric Railroad Company and the Lindell Railroad Company, Special Examiner John A. Robinson has concluded the taking of testimony and as a result will return into the federal court 2,380 printed papers of testimony and 254 exhibits, such as models and drawings. It is expected that the matter will be taken up by Judge Thayer during this month. There is over \$50,000,000 involved and The Edison Company is the real party in interest as defendants.

The full bench of the supreme court of Massachusetts has decided that an electric street railway company is liable for damages done to street travelers, exercising due care, who are injured by reason of the falling of overhead wires, etc., caused by the failure of the apparatus to support the strain for which it was designed. The case was that of Charles Urgio against the West End street railway company at Boston. The defendant's exceptions were overruled, and a verdict of \$6,666 will stand. The plaintiff was struck and injured by the falling of a defective "ear" used on curves.

An outfit for making photographic drawings of inventions has been set up in the patent office. The work of making copies will be begun on March 1. The object of this it is said is to prevent attorneys from altering original drawings of applications on file.

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE, which keeps inventors posted in the art in which they are mostly interested. — The full address of any patentee, and number of patent found below sent to any address on receipt of one 2-cent stamp. — We will send, postpaid, to any address, printed copies of any U. S. patents, with specifications and drawings, upon receipt of 20 cents for one copy, 35 cents for two copies; 50 cents for three copies. — (See premium offer elsewhere in this issue.) — Address THE INVENTIVE AGE, 5TH AND H STS., WASHINGTON, D. C.

LIST OF PATENTS

GRANTED FOR INVENTIONS,
JANUARY 23, 1894.

[See note at head of this list.]

- Adding machine. L. S. Burridge and N. B. Marshman.
Adjustable screen. J. E. Snives.
Air brake attachment. T. L. Richardson.
Air brake mechanism, automatic. G. S. Jeffries.
Air purifier, return. D. W. Marmon.
Album, easel. W. A. Holman.
Amalgamating and concentrating apparatus. A. Tornaghi.
Annunciator system. A. L. Vogt.
Bag. J. W. Hill.
Band cutter. J. O'Connell.
Band cutter and feeder. J. O. Reiley and H. P. Myers.
Beating out machine. W. E. Forster and E. H. Taylor.
Bed, invalid. J. Eggert.
Bedstead and couch. M. Rittberger.
Bell, electric 2. C. Turubull, Jr.
Bell for pneumatic tubes, electric call. L. Strouse.
Bell, staff. F. Smith.
Belt. G. E. Zeltmacher.
Belt, electric. W. C. Fuller.
Berth, ship's. E. Lawson.
Bicycle. J. A. Richards.
Bicycle gearing. D. C. Frazee.
Bicycle support. J. A. McGinnis.
Billiard table, book case and desk, combined. S. A. Faribault.
Blackboard and desk, combined. H. E. Butler.
Blower, powder. R. S. Knode.
Bolt. W. V. L. Grubb and J. Peeling.
Book covers, machine for making. C. J. and A. E. Coles, J. C. Smith, W. Jameson and A. I. Jacobs.
Book, mercantile check and advertising. J. McKinley.
Book support and leaf holder. J. M. Lloyd.
Boot tree clasp. A. D. Warner.
Boring and mortising machine, portable. E. K. Thoden.
Boring machine. H. W. Crane.
Box strapping and corner iron. R. C. Snowden.
Braid. G. Quambusch.
Breast compressor. T. R. Chambers.
Brewing vat. H. Strater.
Brick machine. P. L. Simpson.
Bridge, suspension. W. H. C. Greer.
Broiler or toaster. F. Groos.
Brush, stencil. L. W. Baldwin.
Bucket mechanism, drop bottom. G. H. Hullett.
Buckle attachment. S. C. Anderson.
Building block. D. B. Schmall.
Calculator, logarithmic. J. Billeter.
Capo tasto. F. R. and R. Whelan.
Car and train pipe coupling, combined. W. N. Sewell.
Car brake. S. V. Bahme.
Car brake. G. F. Brandau.
Car brake. G. M. Brill.
Car coupling. J. Evans.
Car coupling. E. Hays.
Car coupling. L. D. Murphy.
Car door. E. L. Phipps.
Car door, freight. J. J. Mulligan.
Car, dumping 2. E. A. Trapp.
Car for elevated structures. H. W. Kirchner and G. N. Chase.
Car, fruit. H. A. Smith.
Car grip, cable. W. H. Russell.
Car, Railway. H. K. Ingram.
Car ventilator. A. A. Miller.
Cars, electric motor for street. B. G. Lammie.
Carts, combined holder and supporter for tip. C. P. McClanathan.
Cash register and indicator. C. J. Ryberg.
Castings, making steel. N. Washburn.
Chair foot rest, rocking. L. E. Armstrong.
Chenille fabric, woven. C. A. Schmidt.
Churn. G. G. Davis and E. Sawyer.
Churn. R. R. Wayland.
Churn power. M. M. Taylor.
Circuits, means for neutralizing self induction in alternating. E. Thomson and E. W. Rice, Jr.
Circuits, method of and apparatus for preventing phase displacement in alternating. C. P. Steinmetz.
Clasp. W. E. Draper.
Clock system, electric. J. H. Gerry and F. M. Schmidt.
Clothes drier. O. M. Shannon.
Coal drill. M. Hardsog.
Cock, stop and waste. H. Mueller.
Coffee stirrer. I. M. Ginn.
Coffee substitutes, preparing. H. Trillisch.
Coil, resistance. H. P. Davis.
Coil, self-induction. C. F. Scott.
Coin slot machine 2. C. P. Young.
Coke oven. T. Baner.
Collar and stiffener therefor. S. D. McElroy.
Color harmonizer. E. Krentzer.
Combination lock. J. T. Heile.
Commutator for dynamo-electric machines. H. L. Fee.
Conveyer. L. Patterson.
Cooker and baker, combined steam. C. Mes-sick.
Corn cutter. W. R. Clark.
Corn cutting device. C. D. Courtright and C. A. Powell.
Cornet mouthpiece. W. H. Tahnadze.
Cotton chopper and cultivator, combined. H. C. Bosley and J. H. Organ.
Crate cover and fastener. C. E. and J. F. Weaver.
Cream cooler and soda fountain. F. W. Merrill.
Crushing or grinding mill. H. J. R. Pamphilon.
Cultivator. W. Hewitt.
Currency strap. R. Spurgin.
Curtain fixture. F. H. Bassett.
Curtain fixture. W. Meyer.
Curtain stretcher, lace. A. P. Bohlinger.
Cutlery, table. J. C. Riedberg.
Dental engine bracket arm, adjustable. J. E. Stanton.
Dental handpieces, adjustable angle attachment for. C. L. Furman and G. E. Holland.
Dental plugger. G. A. Foster and G. E. Hoffman.
Desk. K. Lee.
Desk lid support. C. Dorth.
Dishcloth holder. H. F. Wheeler.
Disinfecting apparatus. B. McEvoy.
Distances, instrument for ascertaining. V. de Ziegler and C. Hager.
Door stop. H. C. Hippincott.
Donche and bath contrivance, washing. T. E. M. Bulow.
Dress shield. R. Raphael.
Drying kiln. E. A. Kinney and J. S. Holdy.
Duplex engine. E. E. Clark.
Dust collector. J. K. Miller.
Dust or shavings collector. H. L. Day.
Duster. G. W. Griswold.
Dyer's vat. T. A. Harris.
Easel. G. W. McCann.
Electric conductors, means for cooling. H. A. Rowland.
Electric elevator. N. P. Olin.
Electric light cut off. J. B. Stewart.
Electric light fixture for music stands. W. J. Kelly.
Electric machine, dynamo. G. F. Dieckmann.
Electric machine, magneto. H. H. Taylor.
Electric meter. C. Gudger.
Electric meter. J. C. Henry.
Electric motor controlling device. J. E. Stanton.
Elevators, electric safety device for. B. W. Magrane.
Exhibitor, goods. D. B. English and S. H. Humant.
Fan, automatic. J. T. Vann.
Fare recorder. A. Katzyk.
Farrowing booth for brood sows. W. Johnston.
Faucet. D. Devlin.
Faucet, measuring. P. B. Bassett.
Feed water, heating. G. M. Mullen.
Fence. J. C. Groschke.
Fence machine. W. T. Snipinger.
Fence post. C. E. Bronson and L. Heiland.
Fence post. C. M. Kiler.
Fence post support. C. P. Reist.
Fence, rail. M. S. Smith.
Fermentation, apparatus for preventing. J. R. Power.
File and the like provided with pins and devices for securing papers thereon, paper. M. Kragen.
Filter, attachable. T. C. Andrews.
Fire apparatus. J. B. Hunter.
Fire escape, flexible metal. T. Prushey.
Fire extinguishing apparatus. J. B. Hunter.
Fire extinguishing apparatus. M. Vinning.
Fireplace frame. J. H. White.
Flue cleaner. C. E. Davey.
Flue stopper, adjustable. W. G. Rau.
Folding machine, circular. J. R. McDonald.
Folding stand. T. A. Clarke.
Foot bench, folding. A. Epstein.
Fork holder, safety. G. Sasse.
Furnace. E. L. Ford.
Furnace, mechanical stoker. R. Newton.
Game apparatus, foot ball. T. Knight.
Gas and electric coupling. W. J. Kelly.
Gas lighter, electric. W. L. Brown.
Gas motor igniter. W. F. West.
Gate. W. E. Wieland.
Glass decorating apparatus. F. E. Gnant.
Gold and silver from cyanide solutions, apparatus for precipitating. C. Carter, A. H. Bell and C. T. Boehm.
Gong, electro-mechanical. N. H. Suren.
Grain dump. J. S. Seely and C. R. De La Maty.
Grate bar. C. Turnofsky.
Gun barrel. H. A. Kingsland and W. P. Sanger.
Gun, breech loading. J. M. Browning.
Gun carriage. K. Haussner.
Hame hook. R. B. Swann.
Hammer, power. L. D. Howard.
Hammer, stone-cutter's bsh. J. O'Donnell.
Harp for bicycles, wind. I. Arner.
Harrow, circle. H. Jaenisch.
Harrow, disk. T. Boggs.
Harrow, disk. C. S. Sharp.
Harrow, spring tooth. M. J. Todd.
Harvester, corn. J. B. and G. T. Tuckerman.
Harvester elevator. F. A. Judie.
Hay loader. J. L. and P. C. McCreary.
Head block air cushion. W. E. Deau.
Heating apparatus, steam. H. C. Simmons.
Reel stiffeners, machine for cutting. G. F. Moore.
Hoisting and conveying machine. D. I. Calhoun.
Hoisting apparatus. C. Pay.
Hopper of dressing or separating machines for flour, &c. J. M. Rishworth, S. Ingham and J. Vickers.
Hoseshoe. B. F. Fink.
Hoseshoe bending machine. H. E. Darby.
Hoseshoe fastening. E. T. Covell.
Hoseshoe swaging machine. H. E. Darby.
Hose clamp. S. J. Hart.
Hub. C. G. Berger.
Hydraulic presses, shears, &c., mechanism for controlling the operation of. E. W. Naylor.
Identification device. J. Sandek.
Index. W. H. Schuyler.
Index, telephone. A. N. Webb.
Inhaler. W. B. Spencer.
Injector. P. Brownley.
Invalid rest. C. H. Parلمان.
Jewelry and small ware, producing reflecting properties in. J. Esser.
Journal box. F. G. Batford.
Knender, dough. J. M. Crowley.
Knitting machine, bid-down. H. C. Right-mire.
Knitting machine presser wheels, &c., adjustable supporting device for. A. and I. Tompkins.
Knitting machines, automatic electric stop-motion for. J. Buchel.
Lamp, electric arc. W. Jaudus.
Lard coolers and purifiers, indicating device for. W. H. Deemer.
Lathes, construction of. C. A. Windmuller.
Lattice or truss girder. H. Joly.
Lead, apparatus for the production of white. N. K. Morris and J. W. Bailey.
Letter, sign 2. J. G. B. Rodwell.
Life boat. A. Schenemann.
Lifting Jack. A. L. Stanford.
Lithium pressing apparatus. D. N. Melvin.
Lock. J. J. Ridgway.
Lock marking gage, door. F. K. Etherington.
Lubricator. C. C. Young.
Maltng apparatus. F. Kuntzell.
Meat, &c., machine for cutting. A. Scheid-thauer.
Metal sulfide from hyposulfite solutions, precipitating. H. Hirschling.
Metals by means of electricity, process of and apparatus for melting. A. F. W. Kreinsen.
Metallurgical plant. E. L. Ford.
Meters for estimating the volume and density of alcohols, &c. A. V. L. Bodent.
Microphone. A. Groper.
Milk receptacle. J. M. Matthews.
Mines, electrical apparatus for firing sub-marine. G. Bertolini.
Mining machine. J. L. Berry and J. T. Cressy.
Miter, level and square, combined. G. C. Hatch and J. Wenger.
Mixing materials, method of and apparatus for. T. A. Edison.
Molding machine, outside. C. D. Marsh.
Monkey wrench. E. C. Wells.
Mower, lawn. W. M. Ring, J. W. Smith and A. Amess.
Mowers, grass collector for lawn. E. Anderson.
Music leaf turner. S. H. Redmond.
Musical instrument attachment. M. J. Betz.
Nasal expander. W. A. Dayton.
Nipples during threading, device for holding. J. H. Riley.
Nozzle and sprinkler, combined. A. L. Young.
Nut lock. E. Hays.
Nut lock. J. Schirra.
Nut lock. R. C. Snowden.
Nut wrench. J. Hardy and B. Dunn.
Oil heater. W. Masters.
Ore concentrator belt. H. J. Summerhayes.
Package carrier. W. H. Allach.
Packing. J. Murphy.
Packing, car door. F. E. Canda.
Padlock. W. F. Troast and S. B. Slaymaker.
Pail. B. B. A. Knop.
Paper spool or bobbin 2. G. E. Grimm.
Pencil holder. S. L. Lazaron.
Perambulator. L. Roberts.
Phonograph 2. T. A. Edison.
Photographer's bath and printing frame, combined. F. Sandeman.
Piano muffler or soft stop. E. M. Quint.
Pistol. W. W. Kinnaball.
Planter, check row corn. H. Pitman.
Plow. F. S. Moore.
Plow. G. Moore.
Plow sweep. J. F. Reeder.
Pneumatic tube systems, station for. H. C. Kelly.
Post driver. C. T. Cannon.
Printing from stencils, machine for. T. H. Stackhouse.
Printing machine, platen. J. Winterton.
Printing press. J. J. Pederson.
Propeller. A. W. Case. (Reissne).
Propelling canal boats, electrical means for. J. Sachs.
Pulley, split. L. S. Lache.
Pulley, split. H. F. Kuhlmann.
Pulp strainer. W. N. Cornell and J. W. McCulloch.
Pump 2. C. E. Funk.
Pump, ejector. W. B. Nevill.
Pump governor, air. J. T. Hayden.
Pump, hydraulic air. E. H. Weatherhead.
Puzzle. A. E. Barker.
Radial drill. A. J. F. Mill.
Radiator, electric. W. D. Hough and E. Z. Burns.
Rail brake. H. L. Simmons.
Rail joint. E. P. Caldwell.
Rail joint. M. C. Niles.
Rail joint securing device. J. L. Pope.
Railway joints, automatic locking device for. J. L. Pope.
Railway rail. H. L. Stillman.
Railway signaling apparatus. E. A. Winter-halter.
Railway supply system, electric. H. S. Prun.
Railway track sweeper. G. M. Brill.
Railways, span wire for overhead electric. S. H. Short.
Rain water flowing from roofs of houses, apparatus for separating air from. R. Habermann.
Reel and barrel carrier, combined. H. Mil-ler.
Reeling machine. J. Carsten.
Refrigerator car. M. S. Millard.
Rein support. F. E. Van Loan.
Rheostat. W. Meredith.
Rheostat, automatic. B. C. Van Emon.
Rock crusher. H. L. Kent.
Rock drills, stand for supporting. J. McCulloch.
Rolling mill. J. G. Lanrie.
Roofing, &c., composite material for. E. M. Pritchard.
Rotary engine. T. Harding.
Rubber dam clamp. J. W. Ivory.
Saddle, harness. T. J. Houghton.
Safety brake. K. A. Maynard.
Sash fastener. C. H. Richter.
Sash fastener and operator. J. W. T. Colburn.
Sash holder. T. W. Parame.
Saucepan. R. B. Vanderburg.
Saw-guard. C. G. Bickett.
Scale, pendulum. L. C. Farmer.
School seat. L. Patzelt.
Scraper, wheeled earth. W. E. Kilbom.
Screw cutting machine. C. W. Mettler.
Screw tapping machine or attachment. J. W. Hartley.
Seal, car. C. Myhre.
Secondary battery. E. and L. Peget.
Shoe and making same. G. A. Richardson.
Shoe fastening. W. P. Case.
Signaling apparatus, electrical time. J. H. Gerry.
Sliding and swinging gate. T. C. Long.
Smoke consuming furnace. J. W. Beckwith.
Smoke preventing furnace. C. L. Stacy.
Soldering iron. R. B. Vanderburg.
Sparrow trap. J. W. Henry.
Spectacles. G. C. Bonine.
Speed regulator. E. Salomon.
Spindle bearing. W. E. Allen.
Stage effects, mechanism for the production of. M. L. Fuller.
Stamping press hand guard. T. A. Dicks.
Staves, preparing bung. J. Plenkharp.
Steam boiler. G. W. Lohndolt.
Steam engine, direct acting. W. E. Hill.
Stereotype block trimming apparatus. A. Kayser.
Stoppers, opening lever for bail. W. Noe.
Store service apparatus. H. B. Williams.
Straw stacker. E. W. Kruse.
Street or station indicator. H. R. Knersten.
Street sweeper. A. P. Palmer and H. L. Phelps.
Sulfonic compounds, making pure. E. W. R. Schroter.
Switch and signal apparatus. F. L. Dodgson.
Syringe. J. Lalonde.
Tack driving machine. M. R. and F. N. Etheridge.
Telephone call registering apparatus. L. Kahn.
Telephone switch, coin operated. C. F. Brown.
Telephone transmitter. F. B. Colvin.
Thrashing machine. S. D. Crockett.
Ticket, railway. F. M. Shattuck.
Tile dressing and finishing machine. J. Rapp.
Tile, roof scale. W. Ludowici.
Tire, bicycle. A. Meyer.
Tire tightener. J. Tapp.
Tobacco knife. H. D. Bonland.
Tool or hatchet, combination. C. A. Ketchum.
Toy fence. W. J. and E. Phelps.
Toy, magic. R. Armstrong.
Toy pistol. J. K. Medrick.
Track cleaning apparatus. R. L. Mason.
Track, overhead. J. H. Cook.
Transformers, cooling. H. A. Rowland.
Transformers, cooling the iron off. H. A. Rowland.
Trolley wheel. G. C. Bourdreaux.
Trunk, hand. W. Robinson and F. D. Ferguson-son.
Trunks, bunk for logging. C. D. Matheny.
Trucks, motor support for motor. W. S. Adams.
Trunk lock. L. Hillebrand.
Trunk top. F. Kulknek.
Tubes for hollow ingots, machine for making taper. S. P. M. Tasker.
Turbines, bearing for steam. C. A. Parsons.
Type-writing machine. J. N. Howard.
Umbrella spring. C. A. Price and S. S. Fretz.
Valve. L. J. Hibb.
Valve, balanced slide. E. Lloyd.
Valve, intercepting. B. B. Carter.
Valves, apparatus for refitting stop. C. F. Hall.
Valves, tool for applying or removing renewable seats in straightway. E. H. Lanken.
Valved can. C. E. White.
Vehicle brake. E. Hays.
Vehicle storm apron. J. F. Taubman.
Velocipede. W. C. Davis.
Vent peg for beer or other casks. J. P. Harding.
Vise, portable bench. W. P. Shaw.
Vise, revolving. O. Eisele.
Warping or reeling machine. H. P. Mallison.
Washing machine. E. F. Blank.
Washing machine. G. P. Walter.
Water tower. D. A. Woodhouse.
Weaner, calf or colt. R. M. Franks.
Well drilling machine. S. MacEachen.
Whiffletree. C. S. Sharp.
Whiffletree hook. J. R. Davis.
Window or curtain fixture. G. A. Crisson.
Wire stretcher. L. A. Palmar.
Wrench. L. P. Davidson.
Wrench. J. T. Matthews.

PATENTS GRANTED JAN. 30, '94.

- Acid, process of and apparatus for making carbonic. A. Van Berkel and R. Fliess.
Air-attempting apparatus. J. P. Dornfeld.
Air-compressor, hydraulic. J. H. Champ.
Aluminum sulfid, making. C. T. J. Vautin.
Ammunition-package. E. M. Garland.
Anchor, vessel, R. Zertuche.
Annunciator, M. Garl.
Annunciator, J. H. McEvoy.
Annunciator, F. W. Ross.
Armor-plates, apparatus for use in chilling. T. J. Tressider.
Badge. J. R. Lee.
Bar for transporting money, &c. J. A. Car-law and W. J. Teedley.
Bail, basket. O. Koubislow.
Baling-press. G. C. and C. A. Blakely.
Ball. J. B. Dickey.

- Electrical distribution, system of. W Stanley, Jr., and J F Kelley.
Electrical distribution, system of. C B Tal-
mage.
Electrolytic cell. C T J Vautin
Electromechanical device for bells, &c.
W O Meissner.
Elevator, safety device. W P Kidder.
Embroidering machine. T F Barnum and
J McDermott.
Engine. C L Lincoln.
Engine controlling mechanism. B F Teal.
Envelope fastener. P E Gonon.
Envelope machine. E Ernold and W Hollis.
Excelsior cutting machine. L J Welnlich.
Eye guard, ventilated. H M Tilston.
Fan, rocking chair. E Methke and
H Schwalbe.
Faucet and nozzle combined. M L and
H L Bergman.
Feed bag. E D Bean.
Feed box. N Cobb.
Feeder, poultry. J G Whitten.
Feeding and housing device, stock. O W
Mapes.
Fence machine, slat and wire. A J Haley.
Fence making machine. J Coombs.
Fence post, molding machine. W Bayley.
Fence wire tightener. I M Fish.
Filter, oil can. L L Davenport.
Filter, water. T T Luscombe.
Filter, water or fluid. S B Allison.
Filtering apparatus. J Feraud.
Fire alarm, telegraph system. M J
O'Sullivan.
Firearm, breach loading. W Mason.
Fire escape. A W Carlson.
Fire extinguishers, sprinkler head for auto-
matic. V Lapham.
Fire extinguishers, valve for automatic.
F Gray.
Fire-place heater. J C Treiber.
Fish trap or net. W E Cole.
Furnace. H W Hemingway.
Furnace. D Jones.
Furnace. A Klumbe.
Garbage receptacle. B F Wise.
Gas as fuel for calcining limestone, appar-
atus for utilizing producer. W A Kone-
man.
Gas burner. S M Kemp.
Gas, charging and combining wort, liquors,
&c., with carbonic acid. E Adam and
M O Rehffuss.
Gas engine. H T Dawson.
Gas holder. A Klumbe.
Gas making apparatus. J E Weaver.
Gas pressure gage. C W Hinman.
Gate. W F Gatewood.
Glass polishing machine. M A Opperman.
Glass tube cutter, hand. K W Fenwick.
Gloves, shoes, &c. fastener for. W Q Potts.
Golf stick. G A Ruenmler.
Grain bagger. G Anderson.
Grain binder. F P Colson.
Grain meter. G Anderson.
Granular material from receptacles, appar-
atus for removing measured quantities of.
P Jockum.
Grate bar. C H Gadey.
Grinding spherical or other curved surfaces.
machine for. R Conrad.
Gun, bolt. J P Lee.
Gun mounting. J B G A Gannet.
Gun or catapult, spring. W B Morris.
Guns, automatic shell-ejector for breakdown.
M A Keller.
Guns, ejector mechanism for breakdown.
A T Brown.
Hair structure. H Kinzly.
Hammer, mechanical. H Lemp, C G Ander-
son, and G Landman.
Hammer, power. F J Fox.
Handles, twister head for tool. N Chase.
Harness attachment. C E Barker.
Harvester, corn. J Dable.
Hasp. J L Buckingham.
Hasp sliding staple. J L Buckingham.
Hat crowns and brims, machine for pointing.
G E Brush.
Hay rack. E White.
Hay rake. J G Archer.
Heat generating and distributing apparatus.
J L Howell.
Heel. H Rogers.
Hitching clamp. L Dunn.
Hoop gage. Z L Hayden.
Hoop skirt. J L and D J Coles.
Hoop trier. E C Horst.
Horse check, automatic. W C H Amende.
Horse ice creeper. W Jones.
Horseshoe, elastic tread. J H Bowerman.
Horseshoe, pneumatic tread. H J Welch.
Hose, manufacture of. N Lombard.
Hosiery filling machine. F A Tanzer.
Hydraulic lift. H Lubowski.
Ice cream freezer. T J Harton.
Inhaler. J J Hartnett.
Inhaling apparatus, vapor. E Madden.
Injector, steam. J Desmond.
Insulated rail chair. L McCathy.
Iron, manufacturing oxide of. H W Hem-
ingway.
Ironing machine. A R Selden.
Journal bearing. J J Wood.
Knitting machine, circular. H E Harbaugh.
Labeling machine. F Hasbrouck.
Ladder attachment. E F Guste.
Ladder, folding step. H V Crozier.
Lamp, electric arc. F A Perret.
Lamp, electric arc. W R Gutierrez and
M T Thompson.
Lamp socket, incandescent. J McFarlane
and W B Edgar.
Lamp wick raiser. H W Hayden.
Lathe cutter head, twist. W Miller.
Lathe, turret. F H Richards.
Laths, machine for making metal. A O
Wright.
Laundry articles, receptacle for holding.
A Herdman.
Lawn sprinkler. R Rundquist.
Leather stretching machine. P King.
Lifting jack. S W Fleming and J W
Ressler.
Liquids, &c., apparatus for combining.
E Adams and M O Rehffuss.
Locomotive exhaust nozzle. E W Harris.
Locomotive gearing, electric. G W Swartz.
Locomotives, power transmitting mechan-
ism for electric. M W Dewey.
Loom let off mechanism. J C Bill.
Loom shuttles, operating electric. L W
Lombard.
Loom web fork. W Hinchliffe.
Lubricator. T R Hill.
Marking device. E W Dodge.
Mat-cutting machine. F Wheeler.
Match holder and cigar cutter. W A
Alexander.
Measurer, automatic grain. G Anderson.
Metal working machine. T R Morgan, Jr.
Metal working tool. W H Owen.
Metallurgical furnace. C James and W
Griffiths.
Milk machines, vacuum controlling appar-
atus for. 2. A Shields.
Milling machine. F Holz.
Mine trap door. G J Herth and G Bonen-
berger.
Minnow pail. G Thoma and F Kies.
Moistener, stamp or envelope. D Durst.
Mold, self feed and skim gate. C A Hanson.
Motor. J C Luenburg.
Motor. C W Pearce.
Mower, lawn. W Bayley.
Mowers, &c., knife or cutter for. D B Smith.
Music leaf turner. C S Clishe.
Necktie. J Lister.
Night soil, &c., device for the disposal of.
L D Busbee and C M Rosser.
Nut lock. H Cole.
Nut lock. M C and W J Shuser.
Oil can. E R Deverall.
Oil purifier, waste. M D Hogan.
Ore concentrator. C E Seymour.
Ore concentrator. G W Waitt.
Ore roasting furnace. W P Blake.
Ores, treating black band. E A Fehling.
Oven. A D Ordway.
Ozone, process of and apparatus for making.
C R Poulsen.
Packing machine. J S Voitek.
Paddle wheel, steamboat. P B Spear.
Pantograph for engraving and ornamenting
watchcases. A Zwahlen.
Paper bag making machine. R Mills.
Paper box. D C Clark.
Paper folding machine, packing box for.
T C Baxter.
Pea shelling machine. D A Gaither.
Peanut roaster. E Tannay.
Pencil holder. A N Hanna.
Pendulum motor, compensated. J M Cayce.
Permutation lock. L J Cooper.
Photographic printing frame. C E Lewis.
Piano. L and J F Matt.
Piano forte sounding board. A Roden.
Piano frame, upright. J W Reed.
Pipe or rod wrench. A S King and B
Beardsley.
Planing machine. G Bird.
Planter and fertilizer distributor, combined.
J R Kelley.
Planter, cane. E Oliveray Martinez.
Planter drill attachment. A L and D L
Baughman.
Flow fender. J F Greiner.
Plowshare sharpening machine. S S
Morrill.
Pneumatic tool. C B King.
Potato cutting machine. C V Jones.
Potato digger. G D N Edie.
Printing press. P Ready.
Printing press delivery apparatus. S G
Goss.
Printing presses, device for operating reci-
proating beds. E A Blake.
Printing solid ground colors on wall paper
and making same, roller for. J Paravicini.
Protractor. I B Kiddle.
Pulp digesters, idow off pipe for. C Curtis
and N M Jones.
Pump. H Field.
Pump, air. E Savill.
Pump, rotary. S N Eister.
Punching machine. P L Johnson.
Purifier and dust collector. N W Holt.
Push buttons for floors, bell. N J Busby.
Pyroxylin labels, making. R R Lansing.
Rails to metal sleepers, appliance for secur-
ing flanged. E H Stone.
Railway brush, street. P A and A R
Conrad.
Railway rail chair and cross tie combined.
A J Moxham.
Railway rail joint. A J Moxham.
Railway rail joint. J N Wilson.
Railway rails, electric connection for.
A Green.
Railway, sectioned electric. G W Denrick.
Railway signal. J R Jones.
Railway switch. J R Jones.
Railway switch. A Knelp.
Railway switch, automatic. D B Hart.
Railway switch, automatic. J H McDon-
ough and R S Williams.
Railway switches by screw action, appar-
atus for working. C Moderegger.
Railway tie. J C Lee.
Raisin seeder. S B Bliss.
Recording device, autographic. R J Cope-
land and C H Stoelting.
Refrigerator. T B Ashford.
Registering device, electrical. F von Hel-
fer-Altenack.
Rheostat, automatic. C J Sturgeon.
Rivet setting machine. H H Cummings.
Road crabs, machine for breaking up. A J
Henderson.
Roof or floor, fireproof. T A Lee.
Rope coupling. A Wenk Wolf and O
Strohbach.
Sad iron. B Rein.
Sad iron. M Tverdal.
Safety fender or trap. C Blackstone.
Safety pin. M Frisen.
Sanding and finishing machinery. M E
Clark and M Shebesta.
Sash balance. J E Parrish.
Sash fastener. W E Cline.
Sash fastener. F W Mann.
Saw clamp. F W Seaver.
Scraper employed on tubes of fuel econo-
mizers, triple. E Green.
Screen. G W Cross.
Screw, temper. A T Herrick.
Seal, car. M D Flower and W G Denney.
Seat. T O Colles.
Seat and back rest. C L Russell.
Semaphore operating device 2. J H Frisken.
Separating granular mixtures, method of
and means for. M McDonald.
Separating machine. N W Holt.
Sewing machine. H F Nason.
Sewing machine buttonhole attachment.
F C Hall.
Sewing machine, straw braid. J H Gonyon.
Shade fixture, window. A R Dunkle.
Shade roller. S Hartshorn.
Shaft coupling. S Crolley.
Shears. G H Stockman.
Shingle lanch and binder. W J Munro,
J Hart and D Batey.
Shipping box. R Niven.
Shipping case 2. J M Leaver and E J Vance.
Ships hatch. A McDougall.
Shot holding and measuring cabinet. H T
Luster.
Sifter, flour. C P Eicher.
Slider, vegetable. E D Sibbrel and F
Longabach.
Smokeless powder. E A Starke.
Snap hook. R J Reed and S O Carothers.
Solder for use with aluminium and its alloys.
R I Roman.
Soldering apparatus. F H Lippincott.
Space bar for line casting machines.
C Skatulla.
Spindle retaining device. G A Draper.
Spout extractor, sap. M R Moss.
Spring winding mechanism. F A Richter.
Square for picture frame mats. L H
Barberie.
Stamp affixing device, postage. G E Conrad.
Stamping press. T A Dicks.
Steam engine. S Eveder.
Steam engine. F G Holbart.
Steam engine. S Scognamiglio.
Steam engine, Multiple cylinder. A W
Ofeldt.
Steam generator. D Halpin.
Steam trap. F A Littlefield.
Sterilizing or cooking apparatus. L Edel-
man.
Stone dressing tool. O P Howard.
Stone working machine. S Hermon.
Storage battery. G B Fraley.
Stove and burner, oil. E G Munumery.
Stove attachment, cook. A C Goodell.
Stove or furnace pipe. R H Martin.
Stoves, vaporizer for gasoline. C H Childs.
Straw stacker. F P Richards.
Surgical chair. H G Leisenring.
Suspenders. J A Miller.
Swing support. E D Slaver.
Swinging gate. B O McCoy.
Switch and signal operating device. J H
Frischen.
Switch bar. F A Weller.
Switch operating device. H P Cogswell.
Switch setting and locking device. W
Wendelin.
Tack centering guide for tack driving
machines. D B Nye.
Targets, mold for making composition.
H F Baker.
Telephone. H S Page.
Telephone circuits, signaling system for.
J I Sabin and W Hampton.
Telephone switch, automatic. A C Wheat.
Telephonic transmitter. F H Richards.
Telephone transmitter. F H Richards.
Telephone trunk lines, signaling system for.
C E Scribner.
Tension rod. T A Lee.
Tent. G Tolmie.
Theatrical appliance, electrical. H E Waite.
Thrashing machine. D R Tanager.
Ticket and time table holder. F D Atherton.
Tie, elastic. J V Kemendy.
Tire, pneumatic. W R Barrett.
Tire, pneumatic. J Holt.
Tire, pneumatic. J G Mooney.
Tires, puncture proof band for pneumatic.
S Lee.
Tobacco hooking table. H Zwicker.
Tobacco, manufacture of plug. W W Wood-
Tolloggan, roller. C N Grant.
Toggle arm joint. W W Wallace.
Tongs and shovel combined. J N Crouch.
Tongue support, wagon. S O Eells.
Tool box. W Q Potts.
Tool combination. C C Tront.
Tooth, artificial. E H Neiman and S E
Reecher.
Toy microscope. F W Gardam.
Toy or doll house. E M Smith.
Toy velocipede. J McFarlane.
Train brake, automatic. F B Brock.
Train operated device. J H Frisken and
R Pfeil.
Tramson lifter. G M Garland.
Trap. H S Goff and A B Judkins.
Treadle. D Peglaw.
Trolley pole stands 2. G Valley.
Trolley wire finder. E Gale.
Truck. G F Armstrong.
Truck, car. J W Cooper.
Truck, car. J B Smithman.
Truss. A Hessels.
Truss. D W Lewis.
Tug, barge. L G Gustafv.
Turret machine for boring cylinders. F H
Richards.
Twister roll. A E Rhodes and G A Draper.
Type writing machine. L B Berrien.
Type writing machine, Impression hammer
for. W H Travis.
Underwaist. S T Converse.
Upper folding machine. C E Williams.
Vacuum breaker. T M Enyon.
Valve, balanced slide. A F Kelley.
Valves for fluid pressure brakes, device for
operating. J H Fox.
Vapor burner. S E Folk.
Vaporizer. H Wilkinson.
Vehicle oscillating device. E M Crane.
Vehicle, power driven. W F Farrell.
Vehicle seat. C M Kellogg.
Vehicle top. E D Stevenson.
Vehicle top, folding. S E Kierolf.
Velocipede. W L Decker.
Velocipede gear case or cover. H Bate.
Vending machine. E D Valentine.
Vessel. A McDougall.
Vessel. R Zertuche.
Voting booth. C B and H H Grahl.
Wagon, dumping. B W Clarke.
Watchcase pendant. E C Fitch.
Water gage. T Elcoate.
Water gage, safety. G B Essex.
Watering trough. J E Kordick.
Water purifying apparatus. P Ball.
Water purifying apparatus 2. R T Scowden.
Water and current power. S Husted and
J P Doolittle.
Weigher, grain. H A Stock.
Wheel. T Hartley.
Wheel. A Nelson.
Wheel, spring spoke. G Valley.
Whip socket. H A Smith.
Wick fastener. R F Goodrich and J M
Merritt.
Wire gage. J Poole.
Wire stretcher. J H Gregory.
Wire stretcher. W P Negus.
Wire tightener. W B Fielding.
Woodworking machine. M W and C C Cory.
Wrench. E H Goslin.
Wrench. W A Lapoun.
Wrench. J T Pedersen.
Zinc lead sulfid ores, treating. S H Emmens.
- PATENTS GRANTED FEB. 6, '94.**
Acid and caustic alkali, making nitric. G
Lunge and F M Lyte.
Addressing machine. E E Hanna.
Advertising, apparatus for successively dis-
playing tablets for. F J Beaumont.
Advertising cards, means for displaying. R
Hay.
Aerial vessel. J B Blanchard.
Aerial vessel. S Spaeth.
Alkali and lead chloride, making caustic. F
M Lyte and G Lunge.
Aluminous minerals, purifying. H E D
Schwahn.
Aluminium fluorial, making. W Ackermann.
Animals shears. J K Priest.
Animal trap. C Franke.
Arch support, water purifier and heater. G
W Collin.
Asphaltic composition powder for roadways,
producing. C A Fieer.
Atomizer. W Hingersholt.
Automatic sprinkler 3. R W Newton.
Axle box indicator. J S Patten.
Ballot folder. I W Litchfield.
Banjo. C E Dobson.
Barium, purifying native sulfate of. H F D
Schwahn.
Bat, base ball. C Jacobs.
Bathing apparatus, comping. J J Hentze.
Beam anchor plate. A E Krause.
Bed bottom, spring. M C Silver.
Bed, folding. C B Adriance.
Bedstead, folding. P G LeDan.
Bicycle. J N Maehn and J Graves.
Bicycle. H M Pope.
Bicycle supporting attachment. A K Sher-
wood.
Binders for papers, &c., temporary. E L
Brundage.
Bit. A A Bourgeois.
Blower, centrifugal. G W Poole.
Boiler flue scraper, automatic. P S Kings-
land and C C Hill.
Boiler tubes, rake or scraper for cleaning. S
and L C Abraham.
Bookcase and display cabinet, revolving. R
H Ober.
Bottle opener, capped. W Painter.
Bottle washer. H Portevin.
Bowl or wash basin, set. S P Crosswell.
Bowling alley. A B Crouse.
Box cover, removable. D Cree.
Box fastener. J Davy.
Boxes, opener and handle for shoe polish or
other. J F Smith.
Brick drier. A F Barron.
Brick kiln, continuous. T Green.
Bricks, method of and apparatus for form-
ing. H H Keller.
Bridge gate. F Carlson.
Room and lantern holder, combination. J
C Haxhold.
Buttonhole strip and making snue. F A
Cook.
Cabinet. P Marvel.
Cable grip. J A Timberschmidt.
Can opener. J W Low.
Canopy. W Cole, Jr.
Capo lasto. L L Filstrup.
Car and air brake coupling. S J Galloway.
Car brake. J Smith.
Car coupling. P C Brown. (Reissue).
Car coupling. H C Trask.
Car fender, safety. G Latz.
Car coupling. W F White.
Car, railway. M LeGrand.
Car, railway. C H Newbury.
Car safety guard, street. G T Foster.
Car, safety non-telescoping railway. L M
Worden.
Car ventilator, filtering. C E Robbins.
Carriage curtain fastener. C A Belden.
Carriage top. C G, E M and M T Ridout.
Cartidge. R J Gatling.
Cash register and indicator 2. O Tverdal.
Cash registers, combined draw ejector and
lock for. C F Brown and P G Welty.
Cash register and indicating machine. J J
Webster.
Cash registering machine. A Webster.
Cash registering machine. J J Webster.
Cash registering machine. J J and A Web-
ster.
Caster. J R Sutliff.
Chain, drive. R J Hamill.
Check carrier, sales. W M Kinnard.
Check, identifying. N H Bledsoe.
Chemical flask. A E Osterbridge, Jr.
Chimney attachment or cowl. G Blankley.
Chuck. D P Johnston.
Chuck, drill. O K Schmidt.
Churn. J A Grant.
Churn. A Schmyler.
Churn dasher. J W Ricker.
Cigar box lifter. J Dentsch.
Cigar holder. P Sattelkan.
Cigarette machine 2. A Moonelis.
Cigarette wrapper cutting machine 3. A
Moonelis.
Circuit controller. E J McEvoy.
Clover huller feeder. J N Kallor and M T
Reeves.
Coal, duplex revolving screen for cleaning
and grading. L Ahmann.
Comb and comb cleaner. A Brunner.
Commutator brush. J F Kester.
Condenser, surface. O M Row.
- Cooking, boiling, baking, &c. Apparatus
for. M E Jehm.
Copper, &c., method of and apparatus for the
electrodeposition and refining of. L S
Randolph.
Copy holder. E Kelsey.
Copying press, letter. J H Taylor.
Core making machine. E Grant.
Corset stays, machine for making. H C
Cook.
Corset steel. C Scholl.
Cradle or crib, extensible. C B Adriance.
Crane, hydraulic. G W Zastrow.
Creanery apparatus. G T McLauthlin.
Crusher. W W Sly.
Cultivator. G M Clark.
Cultivator, straddle row. G M Clark.
Curling iron. D Barrett.
Currycomb. W Ramsweiler.
Curtain or shade roller, adjustable hanger for.
S R Smith.
Cut out block. E J McEvoy.
Cutting board. J T Sheffield.
Dental clamp. J M Stront.
Dental handpieces, angle attachment for 2.
F K Hesse.
Dentistry, mechanical. L Robertson.
Derrick. S R French.
Desk, curtain. J F Wilmet.
Desk or table article. W and L Dorsan.
Digester 2. E Menner.
Dipper socket. G W Knapp.
Dish, supported. J B Timberlake.
Disinfectant and preparing same. P Moly-
neux.
Door guide and stop. G A Colton.
Door or window clamp. G W Lake.
Draft equalizer. W Wigham.
Drill bit and reamer for earth boring. A G
F Creed.
Dynamo, alternating. J J Wood.
Dynamo and motor. M Waddell.
Earthenware articles, apparatus for molding.
J Mier.
Egg crate. J West.
Elastic materials, device for closing breaks
in. C L Preher.
Electric alarm. F Siner and C Hentzschel.
Electric arc light fixtures. S Bergmann.
Electric battery. F Bayer.
Electric conductor. H F Chick.
Electric conductor, underground. H A Sey-
mour.
Electric currents, load governor for. F E
Pritchard.
Electric currents, means for generating. N
Tesla.
Electric light, incandescent. N Tesla.
Electric machine, magneto. A J Potter.
Electric meter. C Raab.
Electric motor. J D Hilder.
Electric motor regulator. S H Short.
Electrical conductor. N Tesla.
Electrical resistance. Instrument for meas-
uring and regulating. G B Lawrason.
Electrode for use in the manufacture of
chlorine and caustic soda. J Greenwood.
Electrode, secondary battery. J and L Le-
gay, Fils.
Electroher. E E Cliff.
Electrostatic instruments, induction mechan-
ism for. W E Ayrton and T Mather.
Elevator. J Naylor, Jr.
Elevator motor, electric. J D Hilder.
Elevator safety device. W P Kidder.
Elevators, means for counterbalancing. B C
Keeler.
Embroidering machine. R Spengler.
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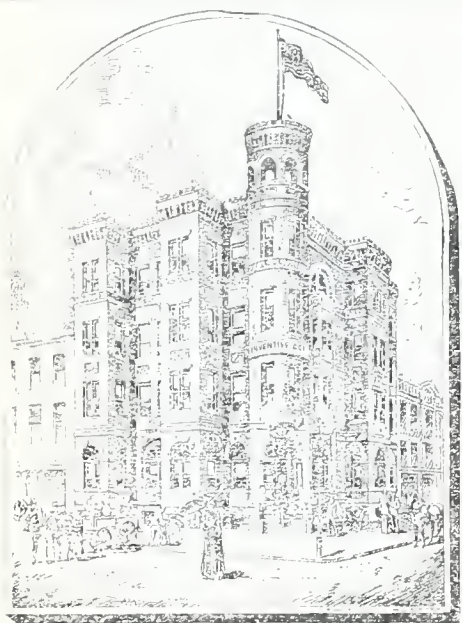
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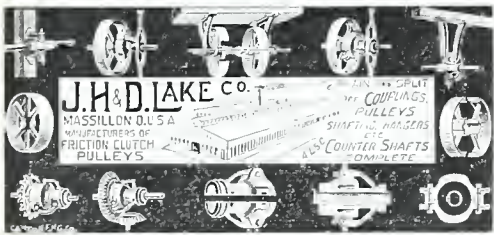
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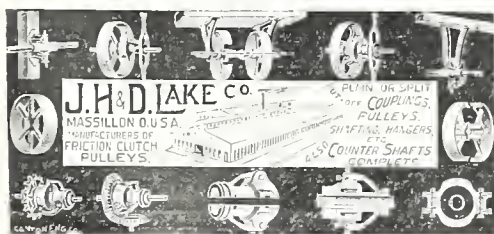
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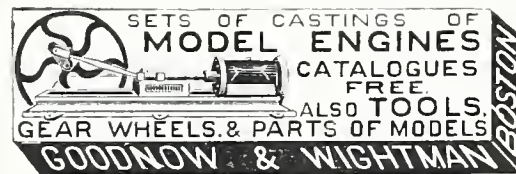


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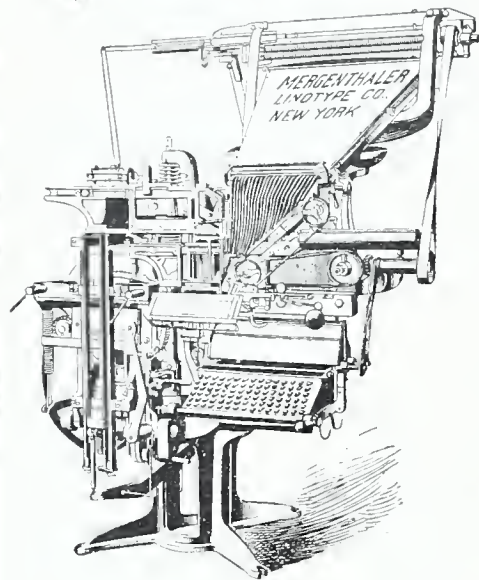
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In saying "for one of the craft to publish what he really thinks of the future would call down upon him the wrath of thousands who do not or will not realize what is in store for them," a writer in a typographical trade journal, in speaking of a machine to displace hand composition, gave evidence that, as a practical printer, he dare not publish his own convictions, but rather preferred to permit the inevitable to dawn upon his fellow craftsmen like the flash thought of a dream; or, possibly, he may have deemed it not the province of a trade journal to give opinions on improved methods; or, that the members of his own craft were presumably given the same advantages as himself in being permitted to examine such machines, and could, therefore, form their own conclusions.

The writer was describing some of the features of the wonderful Page typesetting machine. There is just one, and only one, perfected Page machine in existence. Obviously, as the operator on this machine, without the knowledge of being timed, was setting type at the rate of nine thousands ems per hour, the writer owed it to himself, his craft, and the journal he represented, to at least state that, to all intents and purposes, as far as he was able to judge, this machine was the most remarkable of its particular type that had come to his notice; that he had examined about all the typesetting machines presented to the trade, and that he believed machines to supersede hand composition of type "were a condition and not a theory."

The publication of such an opinion about modern typesetting or linotype machines might not have had much impression upon practical printers generally. The truth would have been stated, however, if applied to any one of them, and some of the more than two thousand compositors displaced by machines in 1893 might have been saved the humiliation of having his practiced eyes, nimble fingers and educated brains superseded by a mass of cam

wheels, pawls, throws, and a casting pot. During 1893 linotype and typesetting machines were installed in 132 printing offices in the United States, 999 machines in all. Before these machines were put into operation there were 3,461 regular and 1,188 substitute printers employed in these same offices. After their installation it required but 2,201 regular

iana and from the Atlantic to the Pacific oceans. Ten New York offices introduced 148 machines and displaced 212 printers; two Washington offices installed 26 machines and threw 93 printers out of employment; five Buffalo offices put in 44 machines and 124 printers were without employment as the effect; four Detroit offices threw 103 printers out of work

by the introduction of 49 machines; four Philadelphia offices relieved 85 printers of regular work by starting up 57 machines while 76 printers were relieved of their situations in Pittsburg by two offices purchasing 25 machines. Eleven Canadian printing offices put in operation 81 machines and 118 printers were thrown out of employment thereby.

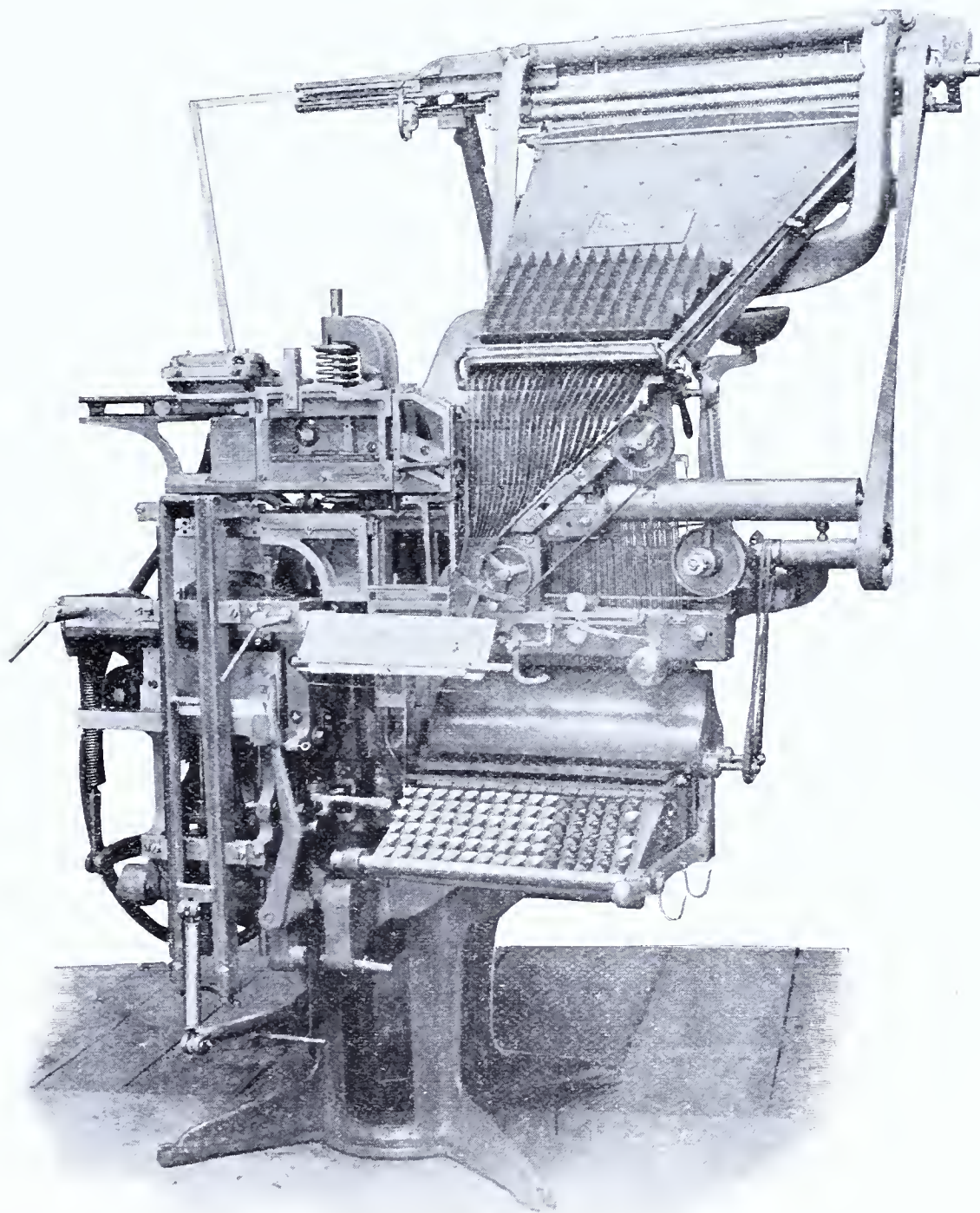
During this same period there were established in the United States 1,396 daily, tri-weekly, semi-weekly, weekly, bi-weekly and semi-monthly and quarterly publications. Although the increase in publications was large in 1893 the journals established were of such a character as to give employment to but a very small, if any per cent of the compositors displaced by line casting and typesetting machines.

Throughout the United States where machines have been introduced an average of 44 per cent of employed printers have been thrown out of work. These figures are gathered from reliable statistics, and would naturally carry the inference that machines to displace hand composition of type were a practical and accepted condition and not a theoretical possibility.

This condition of affairs indicates something. The publisher or master printer will not claim that he put in machines because the price of composition had been raised, for the tendency has been gradually and surely in the opposite direction. The practical printer will not admit that the intricacies of his art have been lessened over former methods of

practice. The accepted improvements in type and type composition have been confined to accuracy of bodies, increased number of faces and the location of the characters in the case before the printer. The keenness of sight, nimbleness of muscles and quickness of thought are just as essential to the correct

(Continued on page 62.)



MERGENTHALER COMPOSING MACHINE.

and 412 substitute printers to perform the work, thus displacing 1,260 regular and 776 substitute printers, or a total of 2,036. And this revolution, unlike the introduction of shoemaking or watch engraving machinery, was not confined to any particular section of the United States, but extended from the northwestern state of Minnesota to Louis-

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WASHINGTON, D. C., APRIL, 1894.

SOME time ago a Commission was appointed in Boston to decide upon the best means of rapid transit. The Commission reports in favor of the sub way scheme. The estimated cost is from \$5,000,000 to \$15,000,000.

INVESTIGATIONS establish nine miles an hour as the maximum speed at which trolley street cars can safely run in great cities. This is far from rapid transit and therefore rules the trolley out in consideration of feasible schemes for rapid street car transit in the down town district of cities.

THE launch of the *Dirigo*, at Bath, Me., marks an ere in American shipbuilding, as it is the first steel merchant vessel ever built in this country. The rapid increase in the building of steel vessels is shown by Lloyd's Register. In 1890 they constituted only 3 per cent of the world's sailing tonage while now they equal 12 per cent.

THE remarkable fire record of last year is being continued this season. The February losses this year aggregate \$11,300,000 as compared with \$10,000,000 for February in 1893. As a result of the heavy losses insurance companies are rerating cities everywhere and increasing the rates. It is a curious coincidence that in times of great depression losses are heavier than in periods of universal prosperity.

ONE of the first acts of Hon. Galusha A. Grow, the newly elected Congressman-at-large from Pennsylvania, was to urge an amendment to the pension laws fixing \$12 a month as the minimum amount to be allowed any pensioner. He argued with great force that if disabled at all \$12 was small enough pay for the veteran soldier, and that unless disabled to such an extent as to deserve this amount nothing whatever should be allowed.

THE sudden collapse of the Brazilian rebellion, just at a time when opposing battleships were being cleared for action, was a sore disappointment to naval experts all over the world. It was expected that in this combat the efficiency or worthlessness of the huge dynamite guns would be demonstrated. There were, beside the dynamite cruiser *Nietheroy*, several modern types of torpedo boats whose usefulness in active combat it was expected to determine in this naval skirmish. But not a gun was fired. It was simply a demonstration and the practicability of dynamite guns is as far from settlement as ever.

AN eight page weekly called the *Patent Office News*, made its appearance March 20. The relation of its editor, Mr. Horace Kenney to the National Printing Company which furnishes the Official Patent Office Gazette for the government, leads to the belief that one of the important features of the new publication

will be the defense of the present administration of the Patent Office against attacks that might naturally follow the disclosures being brought out in the Congressional investigation relating to the printing contract secured by the National Lithographing Company, through the influence of Josiah Quincy, while acting as assistant Secretary of State.

AT last the farmer is promised some of the direct benefits of electricity. Used for supplying motive power in almost every other industry in the world, electricity has never found its way to the farm machine. Experiments now going on make the prediction natural that within the next five years the "bonanza farmer" as the western wheat grower is called, will, with nature's help, husband electricity by the use of windmills, when the wind blows, in storage batteries to be applied in the propelling of all manner of farm machinery. The simple touch of a button and the sulky plow will glide across the field turning over the soil in regular furrows; the harrow, the seeder, and later the harvester; then the thresher and finally the farm wagon laden with wheat, bound for market—all propelled by electricity, generated by inexpensive, and on the western prairies, ever active windmills. Not unmindful of this prospective condition of affairs this possible boon to agriculturists, the Senate committee on agriculture has made a favorable report on Senator Peffer's bill to establish an electrical experiment station for the purpose of determining whether electricity can be profitably applied as a motive power in the propulsion of farm machinery. The bill places the station and proposed experiments in charge of the Secretary of Agriculture and appropriates \$10,000 for the first fiscal year. A prize has also recently been offered by a Netherland society for the best paper on obtaining energy by means of windmills, accumulating the energy electrically and transmitting it or making it portable. The three elements on which this utilization of wind power depends are the windmill, the dynamo and the storage battery, and all these have now, in this connection, arrived at the commercial stage. The estimated average speed of the wind throughout the United States is $7\frac{3}{4}$ miles an hour—in the western States 10 to 15 miles an hour average speed—and anyone with a windmill can have electric lighting and electric power by hitching on a small dynamo and a few storage batteries.

IN this issue of the INVENTIVE AGE appears a timely article on the Nicaragua canal project. This matter is now before Congress and no question is of greater national importance. If anything is needed to remind the American people of the desirability of prompt action in the matter, the recent landing of British forces at Bluefields, on the Nicaraguan coast, furnishes the illustration. That the present administration is not entirely unmindful of the significance of this sudden move on the part of Great Britain and of the desirability of continued American supremacy over this great project is evidenced by the fact that orders were promptly given which caused a fleet of American cruisers to proceed to Nicaraguan waters to "protect American interests." Undoubtedly England is carefully and quietly watching affairs and continued lethargy on the part of this government will be the excuse for her to take a hand in the canal matter soon—a complication not at all desirable by the American people and outrageously antagonistic to American interests.

A GENERAL consensus of opinion seems to indicate that the building outlook is brighter for the coming season than it has been at any previous time within the last few years. The permits that are now being issued show that fewer great structures are contemplated but the number of moderate-sized buildings will be very large, and will give work to a vast army of mechanics—many of whom have been out of work for months. The improved building prospects will, of course, have a beneficial influence on the iron and steel interests, for no structure can be built without involving the use of these metals in some form, and the aggregate business in this line will be very heavy. Taking all in all, the country

seems to be on the verge of better times, for while the building business is always the first to suffer in days of financial depression, it is always the first to recover when the clouds roll by.

THE annual report of the Commissioner of Patents shows that in 1893 there were received 37,293 applications for patents; 1,060 applications for designs; 120 applications for re-issues; 2,247 caveats; 1,899 applications for trade marks, and 401 applications for labels. There was 23,670 patents granted, including designs: 99 patents were re-issued, and 1,677 trade marks were registered. The number of patents which expired was 14,172. The number of patents which were by operation of law forfeited for non-payment of the final fees, was 4,102. The total expenditures were \$1,141,038.54; the receipts over expenditures were \$101,833.19, and the total receipts over expenditures to the credit of the Patent Office in the Treasury of the United States amounts to \$4,281,743.45.

THOSE who had hoped that the investigations pending regarding the alleged irregularities and peculiarities surrounding the letting of the contract, last year, for the lithographing and printing of the Patent Office Gazette, would result in satisfactory explanations all around, will be disappointed at the flippancy of the allusion to the affair made by the Commissioner of Patents in his recent report to Congress. He passes the subject by declaring that "administrative reasons" made the change desirable. It is likely the frankness of this expression is equalled only by the truthfulness thereof.

NEXT month's issue of THE INVENTIVE AGE will contain several important features; among them an illustrated article on the new Anderson reduction system, whereby all manner of city garbage, by a new process of incineration, is reduced to a very small per cent of solid. Machines for casting and machines for setting movable type will also be given an elaborate description, and the admirable paper read by President Warner, of the Washington Board of Trade, before the recent meeting of the American Association of Inventors and Manufacturers will also be published.

THE Commissioner of Patents makes a recommendation in favor of establishing a "patent bar." There seems to be good logic in the suggestion, and it is in the interest of the inventor. It is proposed to admit to practice before the Patent Office only those practitioners whose responsibility and reliability shall have been, at least, partially ascertained by the fact of their having been admitted to practice in the Federal courts.

AT the close of business March 20th, there were 6,885 applications pending in the Patent Office awaiting action, but only 77 of them are of over three months standing.

NOTES AND NEWS.

Stole a Grave.—A Bethlehem, Pa., man has been arrested on the novel charge of grave stealing. Too poor to purchase a cemetery lot he forced open the gate, dug a grave and buried his infant child.

* * *

A Big Street Railway Scheme.—A company has been organized in Chicago and asks for the franchise of building a four-track underground railroad beneath the streets in the business center, as a loop for the elevated roads that cannot now reach the center of the business district.

* * *

Largest Opal in the World.—Word comes from the opal mines near Caldwell, Idaho, of the finding of the largest opal in the world. It is said to be as large as a hen's egg and without a flaw. It is estimated that the gem will dress 325 carats and prove of the highest quality and immense value.

* * *

Railroad Observance of Sunday.—The New York, Lake Erie & Western Railroad has issued an order to hold all common freight trains in the yard from midnight on Saturday to midnight on Sunday, every week in the year, only the necessary crews to handle fast and perishable freight, being kept at work. Modifications are also made in the passen-

ger service, by which some extra hours of rest can be had on Sundays. The order affects nearly 8,000 men, half of whom will get an entire day's rest, and the other will have but the minimized service to carry on.

* * *

Where to Live and Where to Die.—The city having the greatest death rate in the world is Rheims, Germany, the proportion being 28.62 per 1000 in each year. Dublin follows with 27.05 and then New York, 26.47. In Minneapolis, Minn., relatively the fewest deaths occur—only 9.60 per 1000.

* * *

Largest Lake Vessel.—The largest vessel on the lakes was successfully launched at the Wyndotte yards of the Detroit Dry Docks Shipping Company, Detroit, last month. She is 362 feet over all, 42 feet beam and 25 feet in depth. The vessel has been built for a syndicate, and is designed to carry 4000 net tons of cargo.

* * *

The Age of Iron.—Sir William Arrol, having bought the old Hammersmith bridge, at London, intending to use the material for false work at the Forth bridge, found the iron, after sixty-two years of service, as good as new. Pure white lead was at the bottom of the secret. Many of the parts, which were inaccessible, had not been repainted since their erection.

* * *

Electrical Means of Producing Rainfall.—A French scientist, M. Baudion, maintains that water is held in the clouds by electricity, and if this be discharged rain will fall. Hence he proposes to bring about rainfall by discharging it. It is said that experiments on a small scale, with kites, have been successful, and more extended experiments will be made by the aid of balloons.

* * *

Longest Swing Span in the World.—A bridge is now in course of erection across the Missouri river, between East Omaha and Council Bluffs, which will be remarkable when completed as possessing the longest swing span in the world—520 feet—being 15 feet longer than the swing span of the bridge over the Thames river, in Connecticut. The structure has been designed by Prof. J. A. L. Waddell of Kansas City.

* * *

The Miner's Inch.—In selling water a great many standards have been taken as so many "mill powers," a certain number (estimated) cubic feet per minute, and by others, among which is the "miner's inch," which, although it has been "heard around the world" many mechanics do not know even what that standard consists of. Briefly, a "miner's inch" of water means an opening one inch square through a plank two inches in thickness, under a head of six inches of water to upper edge of opening. Such an opening will discharge 11.625 U. S. gallons of water in one minute.

* * *

A Sixteenth Century Gun.—A. E. Brooks, of Hartford, Conn., has secured possession of an ancient gun believed to have been made during the sixteenth century. The arm has been in the Remington family for 100 years, and so far as is known it is the only wheel-lock gun owned in America. It is of the pattern invented in Nuremberg, Germany, in 1515. In 1635 this style of fire arm was improved by the introduction of the flint-lock. It is .75 calibre and unrifled; the barrel is 20 inches in length and the whole gun about 28 inches long. Jerome Remington, of Vosburg, Penn., owned the old arm when discovered by Mr. Brooks.

* * *

Cheating Ancestors and Gods.—A curious industry in some of the provinces of China is the manufacture of mock money for offering to the dead. Formerly sham paper money was burned, but now mock dollars are used. They are only half the size of real dollars, but the dead are supposed not to know the difference; and, moreover, there is no more harm in cheating the dead than there is in cheating the living. To make them, tin, hammered out till it is not thicker than the thickest paper, is punched to the size of half dollars and pasted on disks of cardboard. A boy then takes the pieces, and with two dies, one representing the one side and the other the reverse, hammers impressions of dollars upon them, and the money is ready for use. —*Popular Science.*

* * *

An Old Engine.—What is believed to be one of the oldest engines in the country was recently taken out of the manufactory of Marshall Brothers, Pittsburgh. It is described as an old fashioned slide valve, rocker motion, horizontal engine, cylinder seven

inches diameter, with the extraordinary relation of a 24-inch stroke. The valve chest and steam ports are in a separate casting of very crude form. The engine worked at the leisurely rate of 50 revolutions per minute, and that may be the reason it took so many years to get tired. It was constructed and put to work in the old Marshall establishment in 1820, and has never moved from its original foundation in the 74 years of its life. It churned away steadily, doing all the work for many years, and was then supplemented by an additional cylinder, making it duplex.

* * *

"Greater New York."—On the 6th of November next a popular vote will be taken by the communities interested on the proposed consolidation of New York and Brooklyn under one municipal incorporation. The annexation proposition not only includes Brooklyn, with a population of nearly 1,000,000, and Richmond county, with over 50,000 inhabitants, but thirteen towns and villages, of which Long Island City, with a population of 30,506, is the most important. Among the others are Flatbush, Flushing, New Utrecht, Gravesend and Jamaica Bay. The aggregate population of the territory which it is proposed to take in is 1,164,053, which, added to that of New York, would give to "Greater New York" a population of 2,965,792, and make it second only to London in the number of its inhabitants among the cities of Europe and America. Its area would be about 317 square miles.

* * *

Double-Decked "L."—The solution of the rapid transit problem in New York is likely to come from the addition of a second story to the structure of the Manhattan Elevated railroad. The scheme, now vouched for by Russell Sage, is said to have originated with Jay Gould. The second story will have its own pillars leading up from the street and the two structures will be bolted and joined together, materially strengthening the present elevated road. The distance between the two structures will be ten to fourteen feet, just sufficient to clear the locomotives and cars. The lower structure will be used for the local traffic, as at present. On the upper structure express trains will be run by the new motive power, which it is expected the Manhattan will adopt from among the several hundred schemes offered in response to the company's \$50,000 offer for the best and most feasible power.

* * *

"Slot" Machines for Selling Newspapers.—David F. Cook, of Kokomo, Ind., is the inventor of a novel slot machine for the sale of newspapers, postal cards, stationery, postage stamps, etc. The machine is more especially designed to take the place of newsboys, carriers and clerks and lessen the expense of circulating newspapers as well as contribute to the convenience of the public. The motive power to the machine will be electricity and actuating springs. The machine rejects anything but the proper coin in the proper conduit. By touching an electric button the article desired slips out to the purchaser. It tolerates but a single purchase and one time for each chamber. It also sounds an alarm and shocks with electricity when it is tampered with by mischievous boys and will resent any attempt at fraud, though it never fails to respond when given the proper feed. It is exacting but not avaricious like many other slot machines.

* * *

A Novel Bicycle.—Prof. Albert, the champion 100-mile bicycle rider, gave an exhibition in Washington, recently, of a novel wheel which can be manipulated both by the hands and feet at the same time. It is known as the Dorset hand and foot combination bicycle and can be propelled by the regulation treadles moved by the feet or without them by means of the handles themselves. The upright bar to which the handles are attached is connected below and between the wheels with a ratchet separate from that connected with the treadle axle. A chain from this ratchet is attached to the rear wheel, just like the chain from the treadle ratchet. By moving the hands forward and drawing them into the body again the upright bar works the ratchet. The machinery is so arranged that both the hands and feet can be used for power at the same time. The efficacy of the hand movement in climbing hills is apparent, and an idea of its utility may be had from the fact that a single movement of the bar out and in propelled the bicycle forty-two feet.

* * *

Another Great Mississippi River Bridge.—Considering the quantity of metal used in its construction and its length, the Southern Pacific Railroad Company's bridge to be built across the Mississippi river at New Orleans, La., will, it is believed, be the largest steel railroad bridge in the world. It will be a double-track bridge about 10,500 feet long. The approach spans will vary from twenty-five to 150 feet in length, according to the height of the towers. The main river bridge will be built on the

cantilever principle, and will be 1070 feet in length, with spans of 605 feet on either side. The pier foundations will extend from a point eighty feet below the bottom of the river, and will be sunk by open dredging. The estimated weight of metal required is 25,000 tons, or 5,000,000 pounds. The cost will be about \$50,000,000. The largest railroad bridge completed is over the Firth of Forth, in Scotland. The main structure is 5330 feet long, but the approaches are said to be shorter than the New Orleans bridge.

* * *

Inventor of the Turret.—Theodore R. Timby, who, as a nineteen year old boy, invented the revolving turret which revolutionized modern naval warfare, is now a hale and hearty gentleman of 71 years. Leaving his home in Central New York early in 1841, his attention was attracted to the peculiar shape of old Castle William, in New York harbor. He thought it would be a good idea if the fortress could be revolved and thus bring all the guns to play upon any desired object. This idea stuck to him so thoroughly that on his arrival in Washington he made a crude sketch of a revolving turret, which illustrated but little more than the principle. The originality of the invention was readily acknowledged by men of prominence and a working model was soon in existence. The majority of a board of army and navy experts, however, reported against the idea because of its cost of construction. Nineteen years later, in 1862, he secured broad letters of patent not only covering the specific device but also the principle of its operation. The part the revolving turret played in the civil war, especially in the operations of the Monitor, are familiar history. The very men who were the first to recognize the merit of Mr. Timby's revolving turret were leading spirits in establishing the government which it did so much to overthrow.

* * *

Japanese Currency.—The gold coins now in circulation in Japan, range from \$1 to \$20, while the silver coinage includes \$1 and the subsidiary coins down to 5 cents. During last year the importation of silver bullion was unusually large, and the coinage of \$1 pieces was exceptionally heavy. One hundred silver dollars purchased sixty-one and one-quarter gold dollars. The history of the paper currency of Japan given is of especial interest. It explains the measures by which the depreciated paper of fourteen years ago was brought up to par value without resort to a foreign loan. Between 1871 and 1878 the gold dollar was the unit and was legal tender in that country to any amount. In 1878 this simple gold standard was abolished and the silver dollar of 416 grains and 900 fineness was made universally current in all public and private transactions without limit. Over two-thirds of the gold coins struck in the Japanese mint since 1871 have been exported, and "it is plain that if the present rate of depletion continues, there will soon be very little gold left in the country," while the value of silver coin and bullion has largely increased. The amount of each in circulation is estimated as follows: Gold, \$5,837,892; silver, \$20,481,307. These amounts do not include the treasury reserve, of which there is about \$22,000,000 in gold and \$64,000,000 in silver.

* * *

The Evils of Early Marriages.—The evil effect of early marriages, first on the mothers, and second on the offspring, is beginning to attract the attention of scientific men in many parts of the world. There are certain inherited abnormal tendencies, just as there are certain inherited diseases. By tendencies I mean conditions of mind and body, that manifest themselves in physical and mental deficiencies. These, as a rule, come from the mother's side. If the mother be not fully developed and her character not fully formed, at the time of the birth of her child, the latter will in all probability never be capable of full development. It will be a weakling, morally and physically. It has long been a recognized fact, even among the people at large, that the children of older parents are wiser and better than those of youthful parents. Child-bearing is one of the most severe drains on strength of which we have any knowledge; and for this, nature stores up in the mother a very great amount of reserve strength. As the majority of girls cease to grow after they are seventeen, it is from this age on that this storing up of the reserve strength which will enable them to undergo the physical strain of motherhood takes place. Consequently, it is apparent that when a girl is married before the reserve has been gathered, she is called on to meet the physical strain without the necessary force.—*Dr. Cyrus Edson in North American Review.*

New Projectiles.

A highly successful test was recently made of Holtzer 10 inch armor piercing shells. Two shots with a charge of 183 pounds of powder, gave a velocity of 1,625 feet per second to the 575 pound shell, which pierced the 11½ inch armor plate, 3 feet of oak backing, and entered the sand bank for a considerable distance. A crack in the plate, made before firing the Holtzer shell, was widely opened, the edges turned out and the opening blued by the heat caused by the impact.

NICARAGUA CANAL.

Its Importance to the United States and Reasons Why This Government Should Control It.

It is sometimes said that the waterways improved by the United States never pay. The government has probably paid about \$10,000,000 for the improvement of the Sault St. Marie Canal and the Detroit river. If the commerce passing through each was charged \$1 per ton, or just half the toll paid on the Suez Canal, the income would be nearly \$40,000,000 annually.

The United States, with its Atlantic and Pacific coasts, is like a man owning two farms separated by a narrow strip of land extending in both directions beyond his estates. The distance across this neck of land might be a few rods, while the distance around it by some public road might be miles. The neighbor tenders the owner of the farms the right of way across the narrow strip. Now would a sensible man accept the offer and build a short piece of road over his neighbor's land and establish direct communication with his two farms, or would he persist in going miles around the obstruction?

The Nicaragua Canal is merely an extension of the mouth of the Mississippi river round to the gulf of California and vice versa. It shortens the distance by water from San Francisco to New York from 15,600 miles to 4,907 miles and only 26.8 miles of it is actual canal. The length of this water route is less than twice the land route between the two cities. The city of Chicago has been largely made by the advantages of a water route which, to the head of Lake Erie, is about three times as long as the land route.

American engineers have always regarded the route of the Nicaragua Canal as feasible, while they have insisted that the Panama route was impracticable if not absolutely impossible. It is in fact an ideal route. Just where a crossing is most desirable nature has so prepared the way that the canal can be easily constructed and all unusual risks avoided.

The estimates for a rapid transit elevated street railway from the Battery in New York to 185th street is about as much as the cost of the Nicaragua Canal. A canal to drain off the sewerage of Chicago would cost nearly as much, if the work was done on the estimates made for the Nicaragua Canal.

The bill now before Congress is not in the interest of the New York canal companies. In fact they have not been consulted. Their plans, no doubt, would be to have the government indorse their bonds and build the canal for them, so that they could tax the commerce of the United States and of the world all that it would bear. They have attempted to build the canal commercially and have failed. They need assistance and in accepting it they must give up the millions they had hoped to

realize and must accept their money and interest and a single million according to this bill. Aid will be extended on such terms as Congress deems fair, just and proper. The lender of money or credit usually dictates the conditions on which it will be given. The borrower can decline to receive it.

The channel extends from Greytown, on the east coast, to Brito, on the west coast, a distance of 169½ miles. Both harbors must be largely artificial. Greytown, however, has an ample inner harbor containing about 20 feet of water to which a 15-foot channel has been dredged and jettied. The distance from the inner harbor to lock No. 1 is 9¼ miles through a sandy shore at a slight elevation above the ocean level. The canal is to be 120 feet wide on the bottom, 288 feet wide on the surface and 28 feet deep.

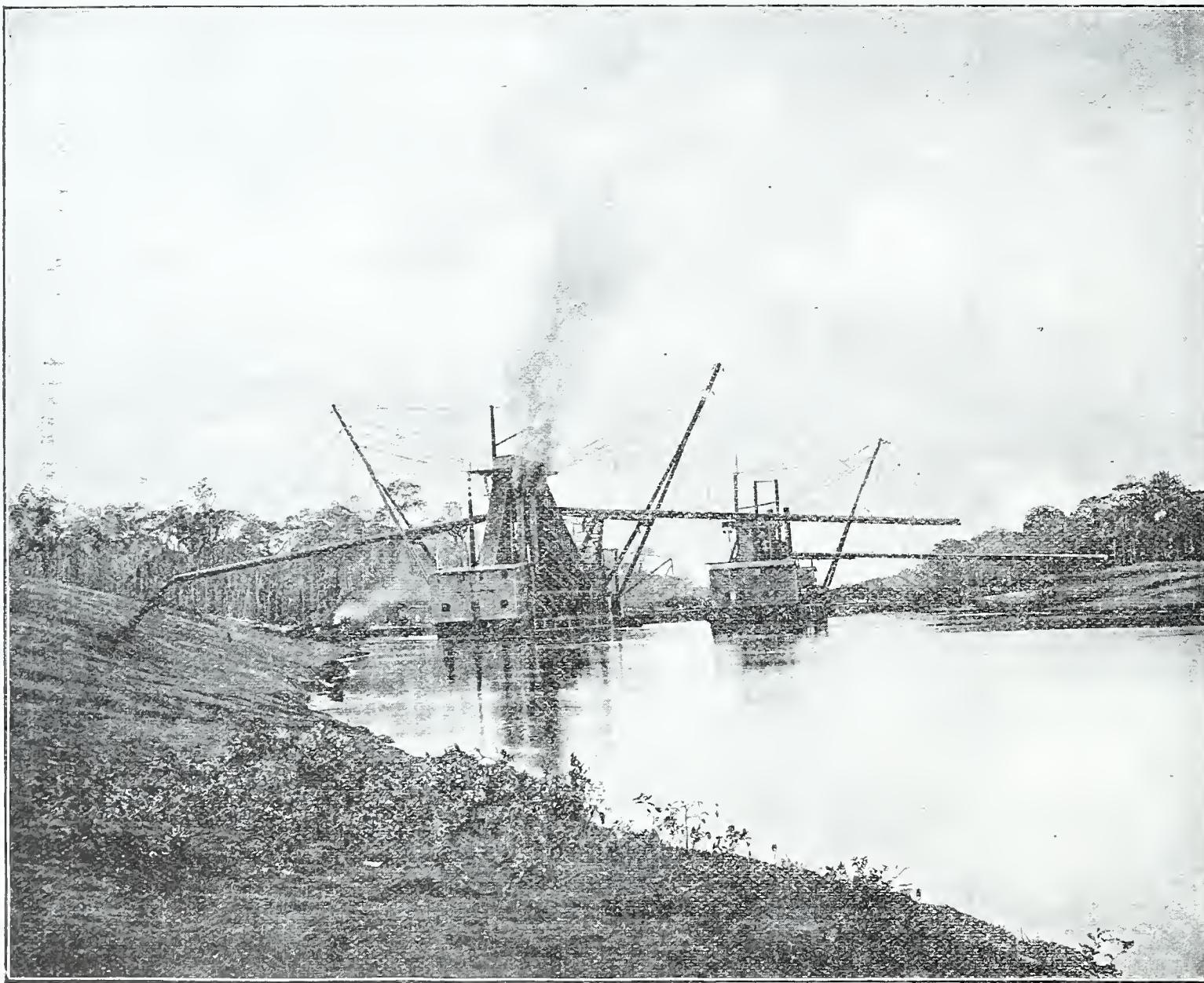
In this channel ships can lie at anchor or pass each other. This lock is 650 feet long and 80 feet wide as are all the other locks, and has a lift of 31 feet. Lock No. 2 will be 1¼ miles beyond lock No.

estimated at four feet, and hence the locks on the east side are to have a lift of 106 feet and those on the west side 110 feet at mean tide.

A curious misapprehension prevailed among the scientific men as late as the middle of the present century. Napoleon's surveyors pronounced the Red Sea to be 30 feet higher than the Mediterranean Sea. It is said that De Lesseps' surveyors reported the Pacific ocean higher than the Atlantic on the Panama survey. As the oceans of the earth are all connected by broad channels around the continents, it is evident that any difference in the sea level must be due to the difference in the tides.

Greece, at Corinth, is cutting through a rocky point higher than the great divide in Nicaragua. The German government is quietly excavating a channel 65 miles in length for a ship canal. Manchester, England, in order to become a seaport, has just finished a ship canal 35 miles long. Egypt long since secured the Suez Canal.

The Nicaragua Canal is of far more importance to the United States than the works mentioned are to the nations of the old world, and yet Congress has done nothing since 1825 but order surveys and investigations and pass resolutions. The apathy and indifference of Congress concerning this project contrasts strangely with the boasted progress and enterprise of the United States. Of the two competing methods of crossing the Isthmus it can be said: That if it were possible to cut down the Culebra mountain of mud and control the torrents of the Chagres river, the Panama route would still be undesirable, as it is within the region of equatorial calms. Sailing vessels would have to be towed 100 miles on the east coast and several hundred



VIEW OF MONSTER STEAM DREDGES AT WORK ON ROUTE OF NICARAGUA CANAL.

1 and will have a lift of 30 feet. Lock No. 3 is about two miles beyond lock No. 2 and has a lift of 45 feet. The next three miles is made a navigable basin to the great divide. This cut, through lava rocks chiefly, averages 141 feet deep for 2.9 miles. From the great divide to Ochoa on the San Juan river is 12½ miles, and is mostly a navigable basin, made so by the dam at Ochoa which raises the river 54 feet, and, by removing two rocky reefs in the channel, secures slack water navigation nearly to Lake Nicaragua, 64½ miles. The distance across the lake is 56½ miles. The eastern shore must be deepened 10 feet for 14 miles. The west shore is somewhat abrupt and the water deep. From the lake to the Pacific is 17 miles. Of this distance 11½ miles will be excavation and 5½ miles a navigable basin. Locks 4 and 5 adjoin and each has a lift of 42½ feet. Lock No. 6 is 1½ miles beyond and is about 1½ from Brito harbor and has a variable lift, according to the tide, of 21 to 29 feet. The deepest cut on the western divide is 71 feet. The slope in the channel of the San Juan river from the lake to the dam is

miles on the west coast. The absence of winds to carry off the miasma produced by the tropical vegetation creates one of the most unhealthy climates in the known world. The Nicaragua Canal is in the belt of the trade winds, and owing to the depression in the mountain chain—it being only 150 feet above the ocean—the winds meet with little obstruction and the climate is comparatively healthy. As to the Eads ship railway the subsidy of \$37,500,000 was based upon the safe transportation of a ship and its cargo together weighing 2,000 tons. Recently a steamer left New York with a cargo of 13,000 tons. Call the weight of the vessel 13,000 tons and the car and frame 13,000 tons and you have to furnish power to haul and build a road bed to support 39,000 tons. Steel, aluminum and science might reduce the weight of the vessel and the car, but the cargo, at least, would be a fixed factor. For some years the Chignecto ship railway has been building between the waters of the Bay of Fundy and the Straits of Northumberland. Its capacity is reported to be for

ships of 1,000 tons burthen, but its completion and success have not yet been announced.

The author of House Bill No. 6,058, one of the measures now before Congress, desires to state that as a member of the executive committee appointed by the Nicaragua Canal convention at St. Louis and New Orleans in 1892, he has studied the project carefully, has examined the elaborate surveys, has inspected the rock material of the numerous borings along the great divide, has consulted freely with the chief engineer and is thoroughly convinced that the canal can be completed for \$50,000,000 plus a moderate allowance for supervision and contingencies. Engineer Menocal fully confirms and indorses this opinion. This, of course, means with sound and economical management and excludes Credit Mobilier speculation and Panama corruption. There is no great danger from natural causes. Since the days of Columbus no earthquake has occurred along the route of this canal severe enough to injure its structures. A dam three times as high as that across the San Juan river, was projected for the Croton reservoir in New York. Build this canal and a hundred new ships will await its opening. Railroad interests magnify the cost and difficulty of the undertaking. It costs twice as much to build and equip a line of railroad across the continent, as it will to build the Nicaragua Canal. The canal will do more freight business between the two coasts than all the railroads and in about the same average time and for one-fourth the cost. There never was a time when capitalists were more anxious to obtain government bonds nor a time when the people were more in need of some outlet for their suppressed energies. Enlist them in building the Nicaragua Canal and they will forget the depression at home.

The estimates on the Nicaragua Canal are 75 to 100 per cent higher than are now being paid on the Chicago drainage canal or on the Illinois Hennepin Canal. For example 11,000,000 cubic yards of heavy lime stone rock are under contract for removal at Chicago for about 75 cents per yard.

On the great divide the estimate for the removal of 8,000,000 yards of light lava rock from a mountain where one blast will probably loosen five or ten times as much as in the Chicago Canal, is \$1.50 per yard. Earth excavation on the Nicaragua Canal is rated at 40 cents per yard. On the western works from 12½ to 28 cents per yard. Dredging and depositing sand on the banks of the canal is estimated at 20 cents per yard. At Chicago clay is dredged and towed five miles for 14 cents.

If the statements of the nine physicians in charge of the 2000 men employed for 14 months on the Nicaragua Canal are to be relied upon the conditions of health are more favorable to the laborer than under similar conditions in the United States.

If this work was fairly investigated and leisurely examined and studied by contractors, no doubt rock excavations would be undertaken for \$1.00 per cubic yard and dredging at 15 cents.

This bill is no Credit Mobilier scheme to build the Canal by governmental aid for the benefit of private parties. It is direct and definite. It is a commercial company in which the three nations interested are the principal stockholders and receive the chief revenues.

The interest of the United States will be about 90 per cent of the whole and they will control it practically; the same as the English government controls the Suez Canal by owning a majority of the stock. The United States can elect to make the canal a source of revenue or a mere aid to commerce like our other improved water ways.

A canal across the isthmus of Florida requiring four days for passage and saving but 500 miles to our coasting trade, has been twice surveyed by the United States. This canal has about the same distance, about the same elevation, has twice as many locks on a foundation of sand and contains a much larger amount of excavation than the Nicaragua Canal, which saves 10,000 miles between our coasts and carries the commerce of the world.

The Suez Canal cost \$100,000,000 in securities or \$55,000,000 cash, and earns \$15,000,000 net annually.

The Nicaragua Canal should cost about the same, and will earn fully 50 per cent more at the same rate of tolls. If built commercially the Nicaragua Canal promises to cost at least \$200,000,000 in securities, and tolls will be \$2 per ton no doubt, while twenty-five cents per ton would pay expenses and 3 per cent on cost, if built by the United States.

This canal route was first investigated and recommended by Henry Clay in 1825. Subsequent examinations were ordered in 1835 and 1837. The survey of 1850 was most thorough for the magnitude of the canal then proposed. President Grant's commission surveyed it for four years, from 1872 to 1876; the Maratime Canal Company for two years. Engineer Menocal says further surveys are useless and a waste of time and money, as he ran 4,000 miles of deviating lines in the vain hope of improving the location or reducing the cost. A few thousand dollars now spent in showing the work to practical

builders will be more profitable to the enterprise than an unlimited amount of additional surveying and investigation.

The United States once by treaty proposed to build the canal and give Nicaragua one-third the net income. The concessions are now virtually free for 99 years, as the land grants are perhaps a fair equivalent for the stock reserved by Costa Rica and Nicaragua. To say nothing of the great importance of the canal for naval and military purposes, it is as necessary and useful to our commerce as the Mississippi river or the great lakes. The interest of the United States, of the world and of civilization require its prompt and immediate construction.

At present dredges and valuable machinery are idle, rusting and rotting in a tropical climate. Nicaragua, according to the newspapers, has already commenced suit against the Maratime Canal Co. for non-fulfilment of the terms of the concession, and, no doubt, will soon declare it forfeited. It will then, no doubt, be for sale to the highest bidder, and the English people may add it to the Suez, or the French may abandon the Panama and build the Nicaragua Canal. In the end the United States may be willing to fight for it, or pay millions for what is now urged upon them peacefully and free.

The five receivers of the Union Pacific railroad modestly ask and are allowed \$18,000 each per annum. The President of the Canal Construction Company is said to have received a salary of \$25,000 per year. The United States engineers receive on an average, perhaps \$2,500 per year. About \$10,000,000 are annually placed to their credit as individuals without bond or security and so far a defalcation or serious misuse has never been known. Scores of honest, capable and faithful men will be ambitious to serve as directors in the Nicaragua Canal at \$4,000 per year. If a commission of business men aided by the professional skill and knowledge of the government engineers cannot build the canal successfully and economically there is no way in which it can be done. The bill is contingent upon the construction of a portion of the work at the estimates. Nearly all the information that is available now was before the Senate in 1891 and can be found condensed in Mr. Sherman's Senate report, No. 1944, second session, Fifty-first Congress.

Ex-Senator Miller has often declared that the canal companies were willing that the United States should build and control the Nicaragua Canal, even if they did not allow one dollar for the concessions. This spirit of patriotism and disinterestedness is truly commendable.

In their present financial difficulties the canal companies will no doubt willingly accept the tender of this bill refunding to them their money and interest and allowing them \$1,000,000 for their concessions. By indorsing bonds for the canal company the government assumes the same liability as in issuing its own bonds and they will not sell as well, not being exempt from taxation. The government has had experience in lending its credit to the Union Pacific Railroad Co., and then not being able to control the revenues or management of the enterprise. If the canal construction company can be reorganized as proposed it may become a useful factor in building the canal and make a fortune for its stockholders in legitimate construction.

M. H. MOORE.

Dubuque, Iowa, March 29, 1894.

Aluminum Boats.

In the test of the aluminum boats made for the use of the Wellman arctic expedition the government was very much interested. Naval Constructor J. C. McGuire was one of the government officials who witnessed the test in Baltimore. The boat tested was eighteen feet long, four feet beam and two feet deep amidships, weighing 350 pounds, and was found to be more stable even than was expected. The boat was put into the water empty and a man tried to capsize it by sitting on the gunwale and hanging outside, but it was impossible to overturn it. It was then loaded with sand bags weighing 3,333 pounds and seven men weighing 1,128 pounds also got on board, making 4,461 pounds in all. Even with this great load the boat was five and one-half inches out of water amidships. The boat was then unloaded and the air-tight compartments were tested by capsizing the boat, but it was impossible to get it more than half full of water, as the compartments held it so high out of the water as to act on the principle of a self-bailer. The boat was then taken alongside the wharf and filled with water until the gunwale was flush with the surface and then a man got on either end over the air-tight compartments. Still the boat did not sink, and as soon as it was cast loose it heeled over and emptied out one-half the water and then righted itself. The air-tight compartments were subsequently tested by being filled with water, and when the doors were screwed down the boat was rolled over and the compartments were found to be perfectly tight.

The Two Types of Invention.

There is in the Bishop collection of jades and other precious cut stones in New York City, a carving representing a crouching tiger upon a pedestal. The beast has glaring eyes that give to it an intensely life like expression. These are not inserted but they are cut out of the material itself. Looking at the mineral in the rough state the artist detected two tiny white spots flanked by a patch of red. At once his inventive mind was quickened. Surely these little patches resemble the glaring eyeballs of some savage beast. The position of the spots and the favorable disposition of the red color intensified the illusion as he turned the stone from side to side. The thing was done. It was only the work of a few months or perhaps years to cut away the useless portions of material until the tiger was revealed. We have often read of the Grecian sculptor who saw his statue in the rough marble. But the statue that he saw was the one that he painfully constructed from modeling clay until his ideal was realized. Not so, the Chinese carver in precious materials. He makes no models, follows no exemplars. Seizing the tiger in the block with his imagination he holds him there until every superfluous grain is removed. It is true of all savage and barbarous inventors and artists that they work without patterns. The forms of things to come, spoken of by ancient philosophers, stood out so boldly in their minds that there needed to be no middle object in the shape of a model to work by. This is seen in the endless variety of patterns created by the American Indians and Eskimo, in basketry, pottery and sculpture. Even in the most conventional things the artists exercise a freedom that is remarkable.

Now we have in these two examples, the Chinese carver, working without pattern to a pure ideal, and the Greek sculptor working his ideal into a model of clay and then imitating it in stone, the two natural steps in the evolution of the inventing process. The primitive inventors simply modified a natural object, charred the end of a stick, pecked the surface of a shapely boulder or ground off the end of a conch to make his Triton's horn. The second stage of the process began when his descendants constructed upon predetermined models, the tool, or machine, or product they needed. The one saw the eyes of the invention staring at him in the stone, the other saw the statue erected in the chambers of his imagination.

O. T. MASON.

How an Ax is Made.

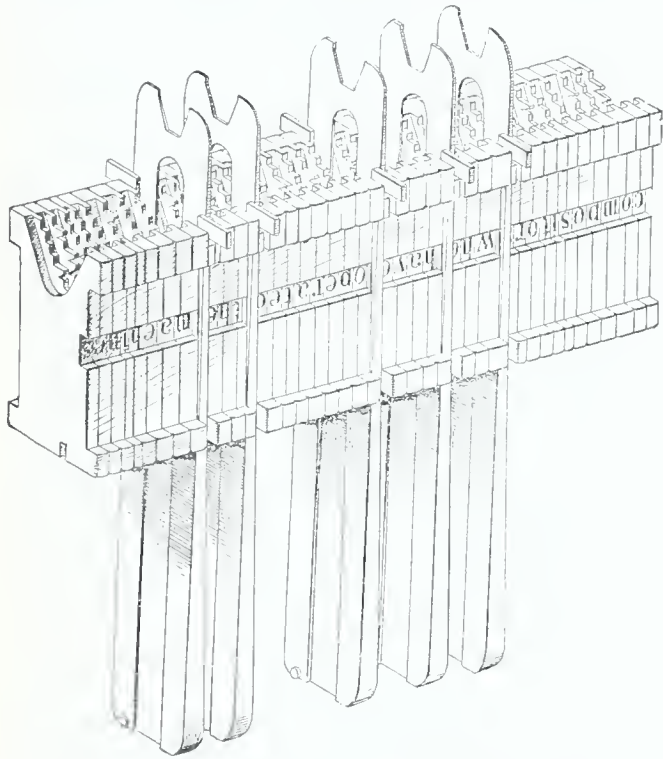
Glowing flat iron bars are withdrawn from a furnace and taken to a powerful machine, which performs upon them four distinct operations, shaping the metal to form the upper and lower part of the ax, then the eye, and finally doubling the piece over so that the whole can be welded together. Next the iron is put in a powerful furnace and heated to a white heat. Taken out it goes under a tilt hammer and is welded in a second. This done, one blow from the "drop" and the poll of the ax is completed and firmly welded. When the axes leaves the drop there is some superfluous metal still adhering to the edges and forming what is technically known as a "fin." To get rid of the fin the ax is again heated in a furnace and then taken in hand by a sawyer, who trims the ends and edges. The operator has a glass in front of him to protect his eyes from the sparks which fly off by the hundreds as the hot metal is pressed against the rapidly revolving saw. The iron part of the ax is now complete. The steel for the blade, after being heated, is cut by machinery and shaped. It is then ready for the welding department. A groove is cut into the edge of the iron, the steel of the blade inserted, and the whole firmly welded by machine hammers. Next comes the operation of tempering. The steel portion of the ax is heated by being inserted in pots of molten lead, the blade only being immersed. It is then cooled by dipping in water and goes to the hands of the inspector. An ax is subject to rigid tests before it is pronounced perfect. The steel must be of the required temper, the weight of all axes of the same size must be uniform, all must be ground alike, and in various other ways conform to an established standard. The inspector who tests the quality of the steel does so by hammering the blade and striking the edge to ascertain whether it be too brittle or not. An ax that breaks during the tests is thrown aside to be made over. Before the material of the ax is in the proper shape it has been heated five times, including the tempering process, and the ax, when completed, has passed through the hands of about forty workmen, each of whom has done something towards perfecting it. After passing inspection the axes go to the grinding department, and from that to the polishers, who finish them upon emery wheels.

MODERN TYPE COMPOSITION.

(Continued from fifty-seventh page.)

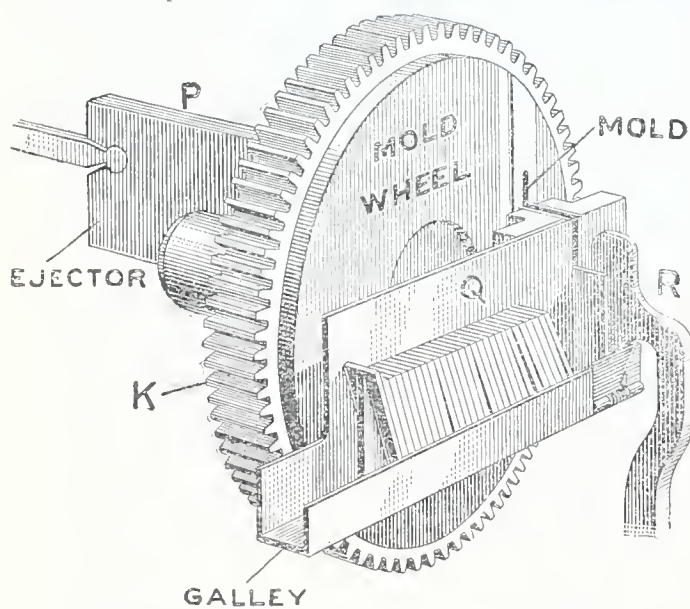
composition of type today as they have ever been. Yet more than 2,000 American printers were displaced in 1893 by machine mechanisms.

This condition of affairs has been brought about by two elements working in direct opposites. Each has been aided by influences of no uncertain determination of an ultimate accomplishment of positive results. One has failed, as the figures above would



ASSEMBLED AND JUSTIFIED LINE, MERGENTHALER.

indicate; the other has succeeded. The practical printer, on the one side, aided by his own and kindred organized associations, by apparently arbitrary and inflexible practices, has inspired publishing and employing printers to urge inventors and capitalists to hurry forward the completion of some machine that would relieve them; and the practical printer has considered himself perfectly secure because he deemed his calling one requiring too much brains to be filled by machinery. It has cost millions of money to satisfy the printer that he was mistaken. The junk piles of some of the best machine shops of the country have been enlarged by costly and complicated mechanisms that have utterly failed to solve the problem, and inventors have gone daft and capitalists broke because of the failure.



MOLD WHEEL—MERGENTHALER SYSTEM.

Yet there have risen out of these efforts machines that do the work, do it well and do it economically, and the end in this direction is not yet. The printing world may be said to be just on the verge of having its attention drawn to a number of new machines that possess the merit of simplicity, accuracy and economy in type composition and line casting, and speed beyond the ability of average intelligence to overcome.

It is not a nineteenth century practice to keep human hands employed in performing a task that machinery will just as well and much more speedily execute. The introduction of labor saving machinery

is the order of the day, and the rule is being applied to the printer's art, and will be more generously so applied in the next half decade than ever before in the history of the world.

The question, just what will become of the compositors thrown out of employment by the general introduction of these machines might be answered by asking what has become of all the workmen employed in other industries before they were displaced by labor saving machinery. They didn't jump into the sea; but the product of their art or industry was so materially cheapened by the use of machinery that the increased demand made necessary their continuous employment. Whether this rule will hold good because of the introduction of machines to decrease the cost and increase the production of reading matter remains to be seen.

It is not the intention of this article to deal technically or critically with all the machines now on the market or about to be placed upon it to supersede hand composition of type, but attention will be drawn to the three most important machines dealing with the most highly improved methods of type composition.

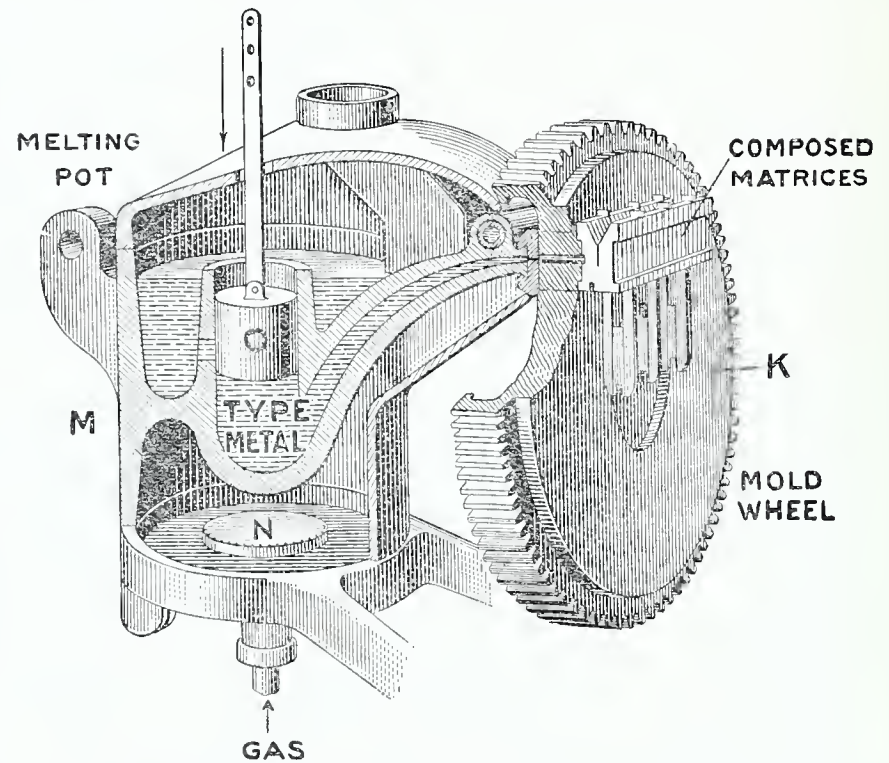
Assuming that the art has generally accepted a solid metal bar or line of type as the unit of product in type composition, instead of a single movable type, the line casting machines will be first taken up, leaving to a subsequent number of *THE INVENTIVE AGE* a discussion of the typesetting and typecasting and setting machines combined, for it will be noted that the field is proposed to be invaded by machines which cast single movable type and set the same into justified lines, thus offering an improvement not only upon the type perfecting machines used by typefounders, but also upon the machines which set nick-backed type by rotary or other means; and also that the publishers of the country are promised to be offered a typesetting machine which not only assembles movable type into lines but at the same time automatically justifies them.

Had any other art or industry remained materially unimproved for more than four centuries, as did the art of type composition, and then only one machine presented that so combined former efforts in this direction that it would actually perform the exacting requirements demanded of the compositor, the columns and columns of articles that would have been published by the press of the country upon the meritorious features of such a machine could scarcely be enumerated in an ordinary publication. True, much has been said in public print about the various machines that have been constructed to displace the trained printer, but it is equally true that but little has been written about the real merit or value of these machines. Their apparently complicated mechanisms have been referred to, and the opinion has been gingerly expressed that they could possibly be made successful, but in most cases the possibility was intimated to be somewhat removed from the date of the original expression. *THE INVENTIVE AGE*, therefore, feels at least somewhat justified in referring to the real merit and efficiency of a number of the most remarkable of these machines.

THE MERGENTHALER LINOTYPE MACHINE.

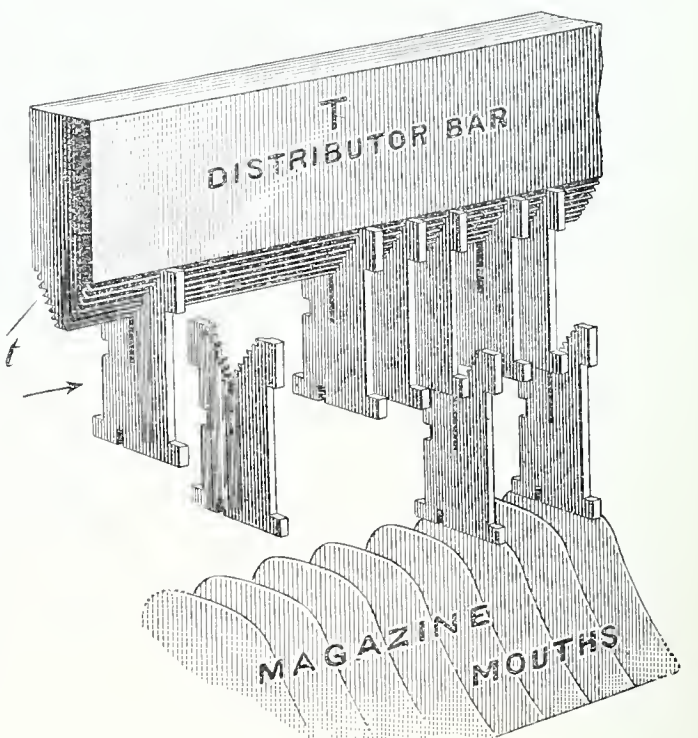
When first constructed, in practically its present form, this machine was most generously condemned as utterly impractical and surely of doubtful commercial value. The opinion was freely given and liberally circulated that it was just simply impossible, through a series of mechanisms, to automatically assemble a number of intaglio type, justify them into a line, secure perfect alignment, then cast a slug therefrom with type faces in relief and place the intaglios back in their proper receptacles; yet

the promoters of this enterprise had confidence in the machine to the extent that if it was not then perfect it could be made so, and there was one great newspaper in America that had the courage to place a number of these machines in its composing room, and to keep them in operation from that time to present date. Eight years ago the New York *Tribune* placed the first bank of Mergenthaler machines in operation, and some of these identical ma-



METHOD OF CASTING LINOTYPES—MERGENTHALER SYSTEM.

chines are yet being operated in this office, unless recently removed to give place to the latest design of this machine; and the Louisville *Courier-Journal*, Chicago *News* and Providence *Journal* followed with other Mergenthaler machines in the order named. It is not presumed that all or that any of these machines were operated with economy over hand composition, or that their product was as satisfactory as movable type composed by hand methods. In several instances it was determined to discontinue the use of these machines and resort to former methods because such was not the case; but the machines were kept in operation and their faulty construction corrected, and in some cases replaced by others of the more modern design, in some minor



DISTRIBUTION OF MATRICES—MERGENTHALER.

details. The general principles of operation, however, have been maintained in this machine from the construction of the first operative one up to the present time. The mechanism of the keyboard has been improved and made more rapid and positive; the aligning devices have been strengthened and arranged to secure satisfactory results; the adjustment of the molds has been made such that the "linotypes" stand true on their feet; the casting mechanism so constructed that unless a line has

been perfectly assembled and aligned it cannot be cast, and the method of distribution simplified and made practically correct.

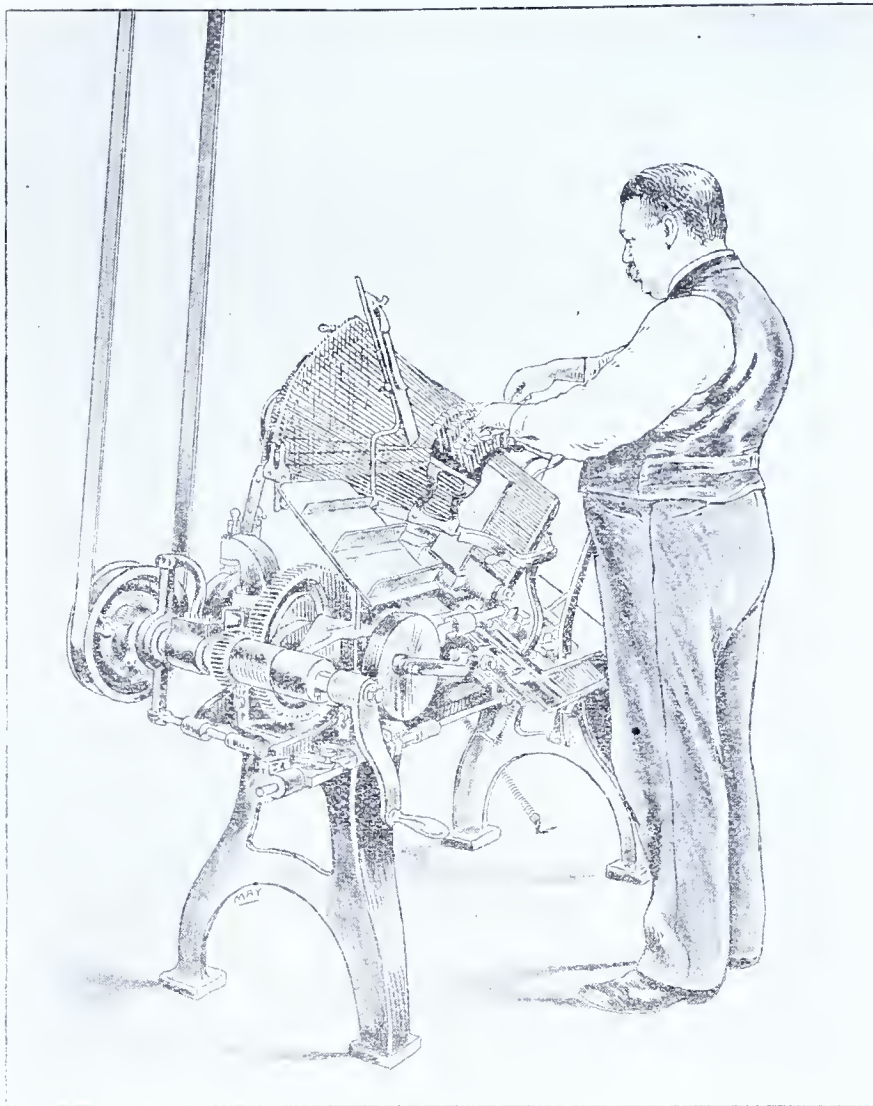
The principal features of real merit in the Mergenthaler Linotype machine, as now constructed and operated, are the isochronism of its various mechanisms, its remarkable speed, satisfactory result of its product, and the commercial value of the machine in practical use. The very fact that an expert operator can seat himself at its keyboard and by a simple indication of the required character-keys assemble a line of female or intaglio type and the machine automatically justify the same to the fixed measurement, cast a metal slug therefrom with the type characters in relief, properly distribute the intaglios back into their respective receptacles and lay the metal slug down before the operator for his inspection, and do this and continue to do it, as has been attested by frequent trials, at a speed equal to the attained and maintained swiftness of four of the fastest hand composition records combined, surely establishes its isochronal qualities and fixes them beyond dispute. Its keyboard mechanism is so constructed and can be operated, as almost any practical engineer will attest upon examination, at a rate of speed equal to, if not greater, than ten thousand ems of composed matter per hour; and therefore, its speed possibilities must be recognized as being beyond the ability of the average operator to overcome. The fact that about one hundred and fifty printing offices, including many of the largest and leading daily papers of the country, have adopted and are using the machine, is sufficient evidence that its results are satisfactory; and, in addition, the attests from publishers and others that they are operating the machines at a saving ranging from 25 to 40 per cent over hand composition, would indicate that it surely possesses commercial value. Thus the opinion of the experts who, but a few years ago, condemned this machine because they considered it impractical and of doubtful commercial value, is not to be compared with present conditions of fact. The typographical appearance of the *Washington Star*, *New York Herald*, *Detroit Free Press* and other newspapers now using Mergenthaler machines, and combining the linotypes with that popular face of movable type known as De Vinne and open De Vinne, which harmonizes with the somewhat open automatic machine spacing, must be recognized by criticising publishers and practical printers as worthy of their admiration as newspapers modern in every respect and satisfactory in every detail.

Some of the speed records made by expert operators on Mergenthaler machines would seem almost

Such phenomenal records of attained and maintained speed may stand for years unapproached, yet the statement of publishers now using this class of machines for type composition would indicate that the machines were being handled by average operators at the rate of about 4,500 ems per hour, and that such composition was being done at a cost of twelve to fifteen cents per thousand ems.

THE ROGERS TYPOGRAPH MACHINE.

The machine illustrated with this article is the original Rogers machine only in the methods of



METHOD OF ASSEMBLING CAMEO TYPE—ROGERS SYSTEM.

assembling and distributing the type and justifying the lines. The first operative Rogers machine carried intaglio type, as does the Mergenthaler machine, but a decision of the courts in favor of the Mergenthaler company enjoined the Rogers company from using female or intaglio type as then assembled and justified in the production of a metal bar with type faces thereon, and the Rogers company then adapted to their machine the Shuckers plan of male or cameo type. So the present Rogers Typograph machine contains male type. These are assembled as were the females, the line is then justified by expansionable wedges, the type impressed into a small bar of lead, and the bars placed in rotation on a receiving galley. There is no casting apparatus in connection with this style of machine. This feature of the work is performed by another machine, which is usually located outside the composing room. The small lead bars containing the impressed lines are passed through a machine somewhat similar to that employed by type founders, and metal slugs or linotypes is the product, ready for the form as would be solid lines of type. Mr. Rogers, the original inventor of this machine, has considerably bettered the male process product by obtaining more nearly the fullness of the original type. The process as now followed has had the benefit of modern methods in the production of steel male type by the Benton punch cutting machine, and the best practices in use in rapid type casting so far as they could be advantageously applied to this machine and its methods.

Several well managed newspapers have introduced this machine into their composing rooms with a

marked degree of success commercially speaking, and the machine has much to recommend it in its general simplicity of construction and operation. An advantage may justly be claimed for it in the removal of the heat incident to melting the metal to cast the lines at the moment they are assembled; in the positive accuracy of its distribution, and the slight expense required to keep it in continuous operation. It is not susceptible of being operated at a rate of speed equal to either the Mergenthaler or Monoline machines. This is self-evident from

the fact that when the operator assembles a line he must impress it into the small lead bar and then tip up the machine to permit the type to slide back to their former positions before beginning a new line. Anyone versed in typefoundry or the best stereotyping practices will understand that the product of this machine could not be expected to reach the standard obtained in machines where hard metal matrices are used. The matrix material must be softer, and considerably so, than is the metal of which the male type are made. These soft matrix bars are subjected to the molten metal under pressure, and in a position removed from the one in which the impression was originally made. It naturally follows that the soft metal in the matrix material will not give as good type faces as if the matrix was of hard metal, and the alignment cannot be so well preserved as if the cast was taken in the originally assembled position; yet on the other hand these machines appear to be giving satisfaction as they are continued in use wherever introduced. Inventive genius is not dead and this system of producing linotypes may yet be improved to meet the full requirements of the art. These machines can certainly be operated much more economically than any other similar one now on the market, and their original cost and installation should come within moderation to publishers, although the machine does not possess that very desirable feature to be found both in the Mergenthaler and Monoline machines which consists in the last type being used before the first brought into action can again come into operation, thus insuring very even wear of type or matrices.

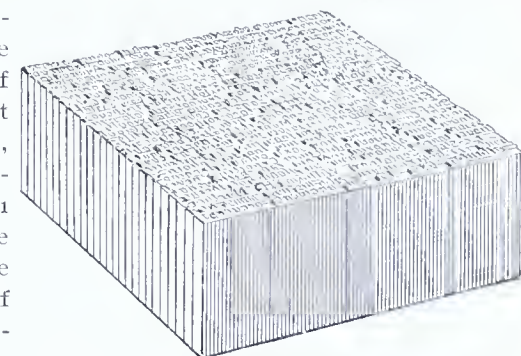
THE MONOLINE COMPOSING MACHINE.

This machine offers exceedingly simple and easily operated mechanisms to assemble and justify intaglio type and cast metal bars with type faces in relief therefrom. It embodies the much sought for features in this direction—that is, a machine which, in its construction and operation, comes within the comprehension of the average person, is substantial, does not require the presence of an expert mechanic, and is moderate in cost. The extreme novelty of this machine is most apparent in the compound matrix bar and the system of distribution. The matrix bar, shown elsewhere in this article, has been increased twice the working size in order to give a comprehensive view of both its front and back. The hooks on the ends of the bars are employed to secure distribution and the slots in the backs to determine alignment. It is the application of this compound matrix bar with parallel sides that has enabled the inventor of the Monoline machine, Mr. W. S. Scudder, to construct a very simple and readily understood and operated



A LINOTYPE—MERGENTHALER SYSTEM.

incredulous to the ordinary printer. The fact remains, however, that such expert operators as Reilly, Smith and McCarty (the latter in charge of the machines at the World's Fair), have given repeated exhibitions of their ability to surpass all expectations as to machine composition. The astonishing record of Lee Reilly—411,200 ems in six days of eight hours each—is said to have been recently eclipsed by F. J. Smith in Denver; the latter composing 432,000 ems of nonpareil in four days of nine hours each. Smith worked from the hook, corrected his matter and kept his machine in running order. The matter was leaded, but making full allowance for this fact, the machine was surely run at a rate of speed equal to 10,000 ems of solid matter per hour.



A SERIES OF ASSEMBLED LINOTYPES—MERGENTHALER SYSTEM.

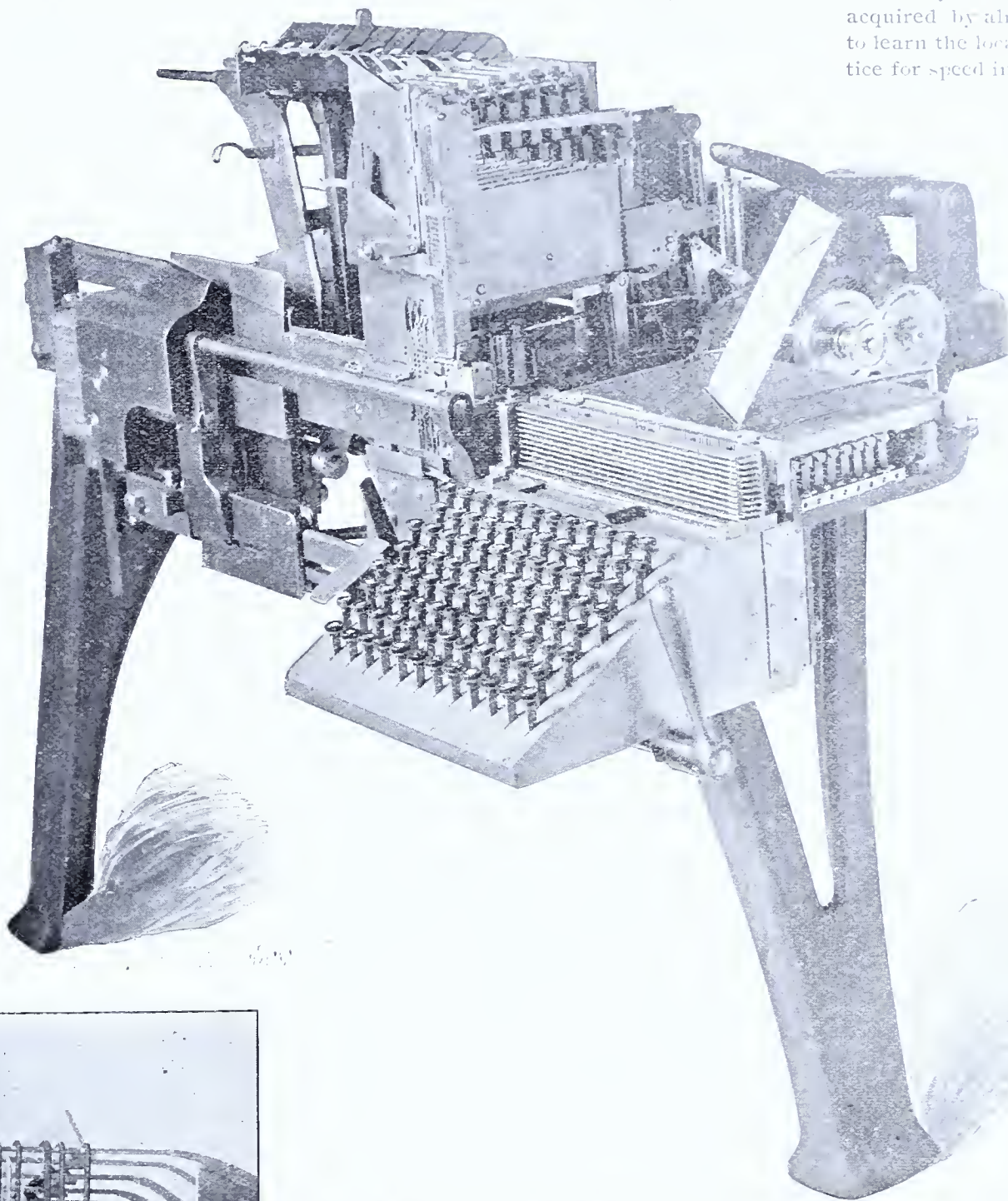
ments in all class of printing, and not be confined, practically, to newspaper work, as hitherto: and perfect alignment of characters—three important and greatly to be desired features not prevailing in matrix bars made by methods now practiced in their manufacture. The members of the Monoline company having this matter in charge were satisfied in advance that the process proposed was the solution of the previous apparently unsurmountable difficulty, but in order to test the method beyond any question of doubt a number of the most difficult type characters to reproduce were cut and a series of matrix bars made by the new method. The type faces might just as well have been of any desired font. It happened that the gentleman in charge of the work brought forth a seven-point letter, and some of the metal slugs or linotypes made at the test are reproduced in this article just as they come from the machine, and the printing world can judge of the value of the invention. It would appear to at once adapt line casting machines to the exacting requirements of book printing, because with even depth of intaglios or height of relief characters and perfect

produced by this new method was only enough to test the accuracy of the work and not of sufficient extent to do any amount of composition. No particular care was exercised in cutting the original

for the work to be performed by the ordinary person. The manipulation of the keyboard does not constitute complete efficiency in machine type composition. Efficiency in this feature of the work can readily be acquired by almost any one who will take the time to learn the location of the character keys and practice for speed in this one direction. Efficiency in the

abstract sense in machine type composition consists in a thoroughly knowledge of the machine mechanisms, the methods of their adjustment and operation, and such familiarity of the keyboard as will permit the continuous actuation of the characters keys in perfect harmony with all the other working parts of the machine. Operators who have made phenomenal speed records are men who have first studied the machine and the methods of its operation and control, and are not that class who have presumed that a mere knowledge of the keyboard fitted them for the task. Such operators have thus been enabled to keep their machines in continuous operation, while the "keyboard expert" has been compelled to sit idly about waiting the services of the expert machinist. Like the swift compositor who sets a long string of matter the last three days of one week and doesn't set any more for another full week, when compared with the steady compositor: he is simply not in it.

A source of great annoyance to the firstclass printer has been the large composing, and, in some



MONOLINE COMPOSING MACHINE.

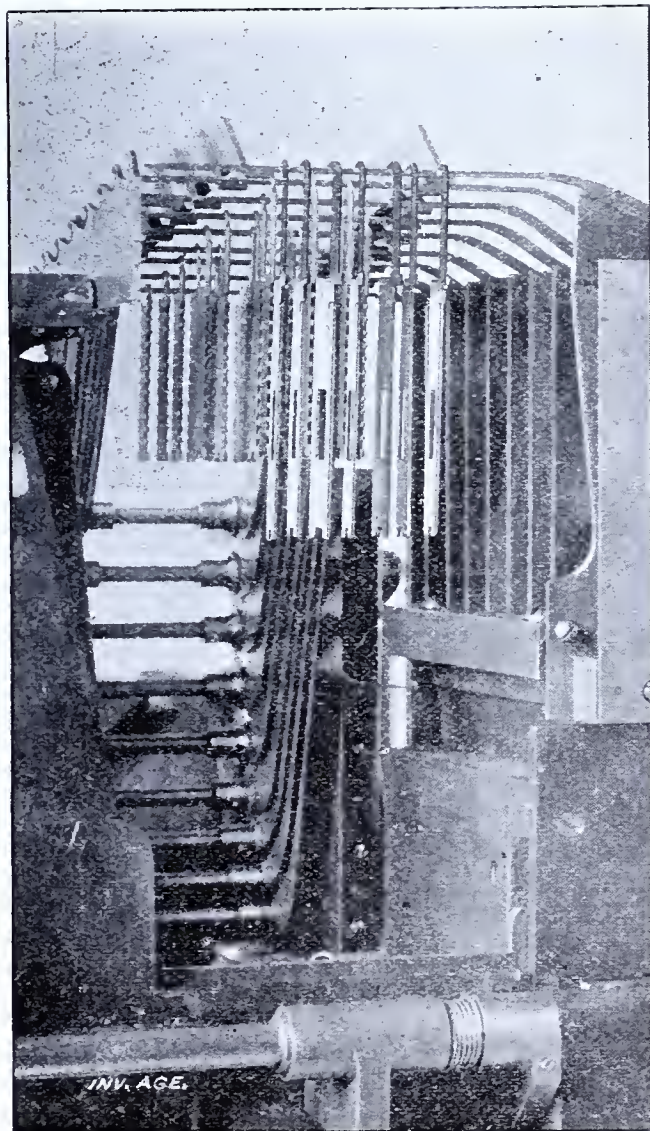
characters, the effort being practically confined to determining the success or failure of a proposed method of automatically producing single or compound matrix bars. The bars herewith used in this article were not selected with a view to getting perfect ones, but were taken at random from the whole number cast as they lay upon the receiving galley on the machine. Proofs were taken of a large number of the slugs cast from this new style of matrix bar, both on an ordinary proof press and also on a platen press, and the whole showed a uniformity not hitherto approached by line casting methods.

The following lines are printed from metal slugs cast in the Monoline machine from matrix bars made by the new process referred to:

Unhorse a man near his home. Hamlet
seures him near Montramp. Ramplamp
Unhorse a man near his home. Hamlet
seures him near Montramp. Ramplamp
Unhorse a man near his home. Hamlet
seures him near Montramp. Ramplamp

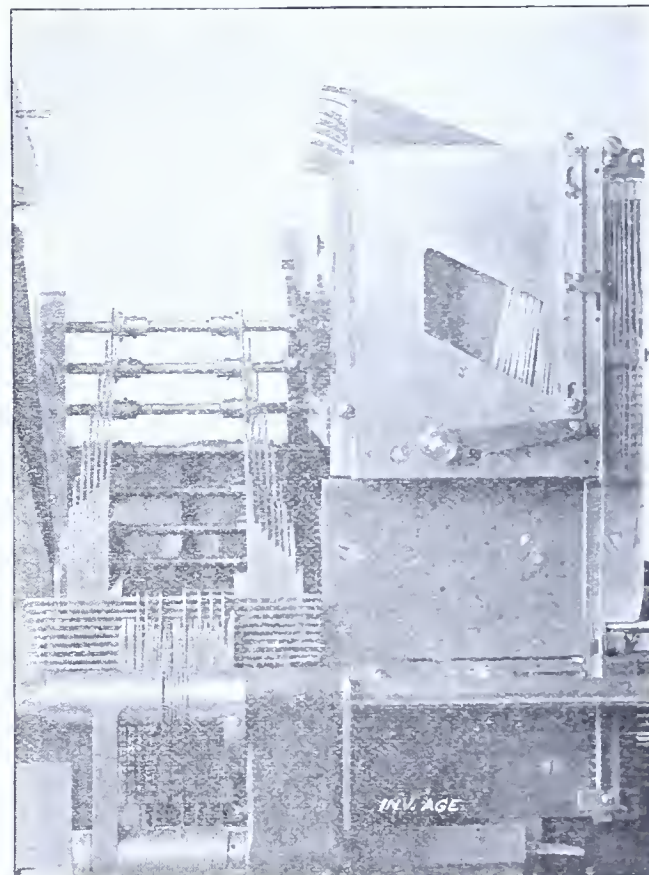
Monoline men operators snap.
Barremorr R H R Harnshoppar
Monoline men operators snap.
Barremorr R H R Harnshoppar
Monoline men operators snap.
Barremorr R H R Harnshoppar

Printers who now close their eyes to the possibilities of machines constructed to do type composition make a mistake. The art is not lost by any means. Trained compositors are the best fitted persons to operate such machines efficiently and profitably, both to themselves and publishers. The requirements of type composition are too exacting



MONOLINE SYSTEM OF DISTRIBUTION.

alignment of type the connection between a perfect and an imperfect product in line casting machines has been made, and the Monoline machine placed in a very enviable position so far as its product is concerned. The number of characters cut and bars



SHOWING ASSEMBLED LINE.—MONOLINE.

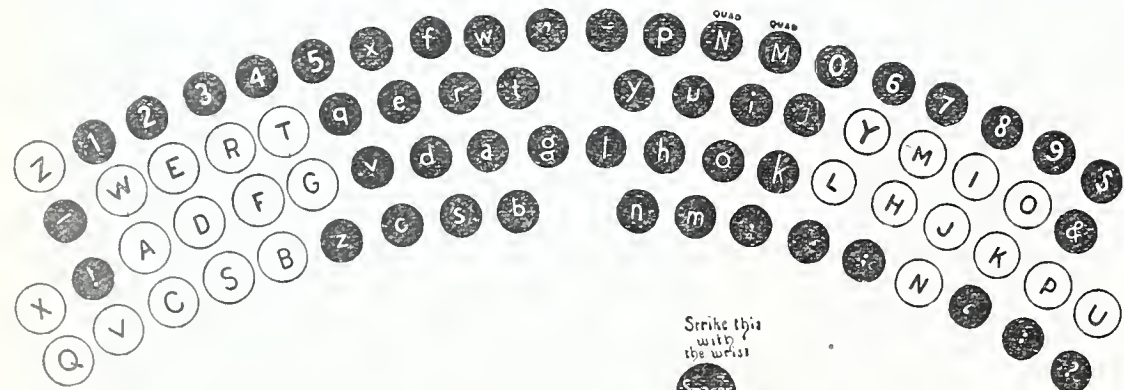
instances, composing and printing establishments combined, which have grown up in small towns contiguous to large cities. In these establishments type has been composed at such ridiculously low figures that the journeyman printer has had fre-

quent cause to wonder if his calling was really an art. While the cost of literal setting of type has been maintained at the minimum in such places as referred to, the total expense per thousand ems when imposed ready for the press has only been sufficiently below union scale to give a small profit. It is learned from reliable resources that the proprietors of these composing offices, in many instances, are arranging to put in line casting or typesetting machines, not particularly because the change will reduce the actual expense of composition, but for the reason that the high speed of such machines will hold the cost of production at present rates and permit the employment of firstclass printers as machine operators. This should have a tendency to place a number of offices under control of the union which are now considered unfair establishments, and if not made complete union offices to give employment to skilled printers.

In view of the condition now presenting itself to compositors it would seem that the proper course for them to pursue is to individually thoroughly familiarize themselves with the mechanisms of all the machines now offered or proposing to be offered by manufacturers to publishing and master printers. And particularly would it appear that this was the correct course to pursue where compositors learn in advance that it is the purpose of their employers to install some certain style of machine. They would thus be equipped in advance to meet the radical change about to come over their daily life. No better way to acquire this knowledge can be suggested than application direct to THE INVENTIVE AGE for copies of the patent office drawings and specifications of the various or individual linotype and typesetting machines. These will be supplied at a nominal cost, as reference to another column will indicate; although manufacturers of these machines have, or no doubt will have, illustrated catalogues fully setting forth their machines in detail, and will furnish these on request.

Limitations of Julius Cæsar.

Julius Cæsar was considered a great man; and so he was. But he had his limitations. We may give a few illustrations. He never rode on a street-car in his life. He never spoke in a telephone. He never sent a telegram. He never boarded a railroad train. He never read a newspaper. He never viewed his troops through a field glass. He never read an advertisement. He never used patent medicine. He never cornered the wheat market. He never crossed



ROGERS KEYBOARD.

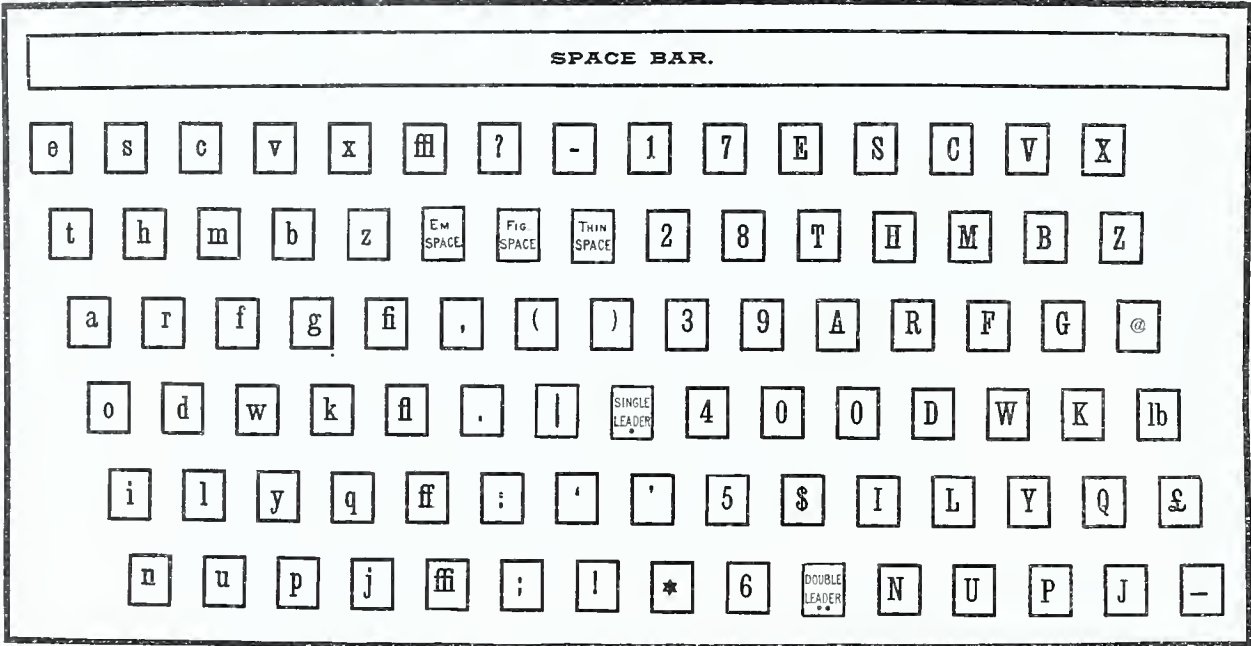
the Atlantic. He never looked through a telescope. He never was in a machine shop. He never went to a roller-skate rink. He never controlled a manufacturing establishment. He never was a member of a stock company. He never dictated a letter to a type-writer girl. He never invested in railroad stock. He never played a game of seven-up. He never chewed tobacco. He never smoked a cigar. He never saw an electric light. He never listened to a phonograph. He never mailed a letter. He never had his picture taken. And he never was in Chicago.

Then what did Cæsar do? Oh, he was a great man, to be sure. He was a great general. But many of our school boys know things which Julius

Cæsar never knew. If Cæsar were alive now, and knew no more than he knew at the time he lived, he would probably not be called very great. The ignorance of his age entailed limitations upon the man.
EUGENE L. ARNOTT.

A New Germ Proof Building.

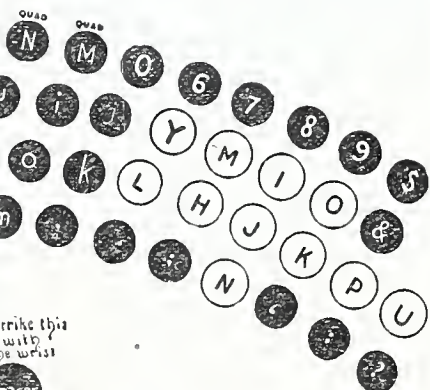
Dr. W. Vander Hayden, of Yokohama, Japan, has invented a germ proof dwelling house which is said to be remarkable, not only because of its aseptic qualities but for the reason that it is constructed of materials that make it applicable to any climate, whether tropical or arctic. The building is both air and water tight and as near disease proof as any building has yet been made. Its antiseptic condition is such that any disease producing germ would immediately die even should one accidentally find



MERGENTHALER KEYBOARD.

its way into the structure. The inventor has been living in one of his pure air, non-disease producing homes for one year and has just given the results of this test to the world.

Glass is the chief article of construction. The walls are of a series of glass boxes filled with a solution of alum. These boxes are formed of two panes of glass each four-tenths of an inch in thickness. The glass is fixed in iron frames screwed together. The whole is so constructed that the building will resist the influence of heat, cold, shocks and earthquakes. Between the joints of the iron framework felt is inserted and then the space is covered with boards. The roof is flat and is supported by cast-iron pillars. It, too, is glass, with strips of rubber covering the joints. Over the glass is spread a thin layer of ashes, and upon this is placed a light wooden frame which is covered



ROGERS KEYBOARD.

ing has outer and inner walls, with a space between affording air passages to neutralize all atmospheric influences without. No doors or windows appear in the building proper. The superstructure is placed on a foundation of brick, the walls of which inclose a sort of basement, and it is through this basement that ingress and egress to and from the residence portion are obtained. The building is heated and ventilated on the most scientific principles. Pure air is secured from the upper atmosphere and conveyed to the interior of the building through pipes, after it has been screened through fine wire netting and filtered

through cotton batting so as to deprive it of any microbes or other disease germs it might contain. After being used it escapes from the house through valves fixed in the walls and ceilings for that purpose. The heat is also brought to the house from the outside through pipes running to open flues in the rooms, and as it passes away through these a draft is created which assists in ventilating the rooms. The whole limits of the building are made as aseptic as a wound dressing of Lister.

Property in Lands and Inventions==Title by Occupancy.

When Noah first stepped from the Ark (at the Mt. Araat landing), there was no one to dispute his title to any part of the earth. He might go north, south, east, west, settle where he would, it was all right.

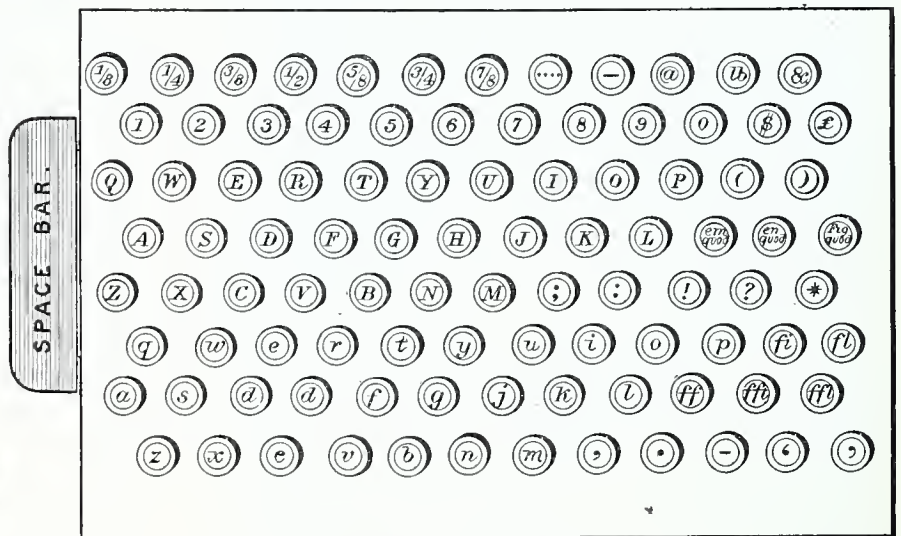
There was no one to order him away, no one to dispute his title, no one to bring suit against him. All property in land, Blackstone tells us, is first and originally obtained by act of occupancy.

And so it is at the present time. The discoverer of a new island or continent may take possession of it in the name of his country. The citizen may gain a title to unoccupied governmental lands by simply living thereon, under the homestead law.

When title is once obtained it may of course be transferred to a purchaser, or vested in heirs or assigns. It can never again be homesteaded, because it will never

again be new or unoccupied.

Now, the inventor may discover a new or unoccupied territory in the field of mechanical thought. He enters into and occupies this territory, so to speak, accurately describing its boundaries in his patent specification, and the government grants a valid title thereto. He may have near neighbors, other inventors may have discovered similar principles, entertained similar conceptions, or patented similar combinations, but he himself was the first of all to enter this particular domain, and his title or claim covers all that is strictly new. He is entitled to protection in his property just as truly as the



MONOLINE KEYBOARD.

with cement to protect the interior from the radiation of heat. The build-

man who has homesteaded or preempted a farm in Kansas.
E. L. ARNOTT.

The Cox Duplex Printing Press.

The Cox duplex printing press, that press which gives high speed and perfected newspapers without the intervention of stereotyping processes and the expense incident thereto, is more than ever attracting the attention of wide-awake managers of publications requiring a delivery of 4,500 to 5,000 printed and folded papers per hour since the exhibition of this press at the World's Fair. The Cox duplex possesses the merit of high speed from flat type forms, and not only prints fast but avoids the necessity of stercotype plates and the time required to make them, and both of these are features in the days of modern printing offices and fast mails.

To complete its files the INVENTIVE AGE desires a copy of March 10, 1891 (Vol. 3, No. 55). Anyone forwarding the same to us at once will be suitably rewarded.

Shall the Rule Be Reversed?

It is whispered that the Commissioner of Patents will hereafter refuse to issue patents in cases where the novelty is limited or its originality is a matter of doubt. The old policy was to issue patents in all instances where a substantial doubt prevailed. In a late paper on this subject Philip Mauro says that the main question is whether the Patent Office has been too lavish in issuing patents, and if so, what have been the evils springing from its undue liberality in the premises. The writer thinks that there has been no undue liberality; that the work of the patent examiners has been characterized by fairness as a rule, with rather a leaning toward illiberality, if any criticism can be made at all. This illiberality can be traced to the courts that have rendered decisions against certain patents, but it would strike the average mind that expert patent examiners are much more competent to pass upon the merits of an invention than Federal judges or others who have not made the matter a special study.

The fact is, however, that there being very few decisions of the examiners that have been reversed by the courts, and certainly not a sufficient number to justify the proposed action of the Commissioner, the step would be calculated to suppress what might be a meritorious invention, and thereby deprive the world of a real benefit.

Mr. Mauro comments seriously on the projected reversal of a rule that has saved many a valuable invention from being buried in the Patent Office. He also condemns "the tendency to trim down each patent to its narrowest dimensions." The inventor should secure the fullest recognition of his rights, even when his invention may be trivial in its character, for it is through small improvements that great results are finally brought to pass. It is the duty of the Patent Office to decide the "novelty and utility of claims," and not whether there has been an exercise of what is called the "inventive faculty." He speaks highly of the care expended by the Patent Office in investigating whether an article offered for patent is old and already patented, for inventors are thereby frequently saved a waste of time, labor and money, with only the reward of certain disappointment in the end.

Mr. Mauro is a keen, terse, vigorous writer, and in this, his latest monograph he presents the case in behalf of inventors in a way that will undoubtedly be highly beneficial to the fraternity for which he speaks.

Fastest Boat in The World.

The fastest vessel in the world is undoubtedly the new English torpedo destroyer *Hornet*. The official trial of the new boat showed that her speed exceeded twenty-eight knots an hour. The *Hornet* is one of more than thirty vessels of a similar type ordered by the English government. The *Havock* and *Hornet* are built exactly alike in every detail except their boilers.

The disadvantage under which ordinary first-class torpedo boats labor is their loss of speed in a heavy sea. These larger and more powerful craft were constructed after the torpedo type for the purpose of overhauling the torpedo boats in a storm.

The *Hornet* is a twin-screw boat, 180 feet long and 18 feet and 6 inches beam. The propellers are three-bladed. The engines are of the tri-compound type, having cylinders 18 inches, 20 inches, and 39½ inches in diameter by 18 in stroke.

The two sets of inverted triple-expansion engines are capable of developing collectively 3,600 horse power, each set of engines driving a screw. There are two surface condensers, two centrifugal pumps and engines for driving them, fan engines, steam bilge pump, evaporator and distiller air compressing engines and engine dynamo for the search light, and the engine for steering the boat.

The armament consists of an 18-inch bow torpedo tube for firing directly ahead and two 18-inch swivel torpedo tubes for side firing, placed on the turntable aft. On the forward conning tower, well elevated above the water line, is a 12-pound quick-firing gun. There are two 6-pound quick-firing guns, one on each side, and a 6-pounder placed on a high stand near the stern. There is a water-tight flat, or lower deck, just above the water line, from the stem to the forward stoke hold, adding greatly to the safety of the boat in case of collision. The coal carrying capacity is sixty tons. The supply is believed to be sufficient for a run of 4,000 miles at a ten-knot speed. The complement of officers and men is forty-two. The *Havock* is reported to have made the marvelous average speed of 30 miles an hour on a run of 100 miles.

National Electric Light Association.

The National Convention of the Electric Light Association, lately held in this city, was by far the most signally successful that has crowned its career.

It was a marked characteristic of the body that the attendance was large throughout each session, notwithstanding the many attractions of the city that usually call visiting delegates away from their duty.

The convention was as fine a looking body as ever convened in the capital.

The convention dealt in facts and figures, from first to finish, with a brace of breaks, one of which was a basket of radiant roses, sent in by the wives, sisters and sweethearts of the members, and the other was a series of stereoptic views of the World's Fair, by Messrs. Martin & Stieringer. The pictures were bright miracles of beauty, calling the wonderful White City into life and light once more.

Chairman Hammer, of the Committee on Rules for Safe Wiring, submitted a series of additions and amendments to the code, that ought to be in the hands of every architect.

Messrs. Stanley & Harrington presented a very valuable paper, on Defective Safety Fuses, and during the contention that followed, Capt. Brophy said that "fuses are a broken reed on which to lean." Magnetic cut-outs were also seriously criticised.

Mr. Vail had some brilliant things to say on the importance of complete metallic circuits for electric railways, and this started a brisk discussion in regard to the electrolytic tendencies

of street railway ground currents—their danger being vividly pointed out by Messrs. Carpenter, Smith, Burleigh, Cuttriss, Brophy, Law and others.

The best way of rating arc lamps drew out a variety of opinions from Profs. Mendenhall, Forbes, Anthony, and other experts. The result was the passage of a resolution declaring that the 2,000-candle power arc lamp in general use is one requiring an average current of 450 watts. This was evidently a step in the right direction; but inasmuch as it was unanimously admitted that the alleged 2,000-candle power seldom gives a light of more than 500-candle power, it seemed a good deal like opening the way for the coal combine to resolve that the standard ton of coal shall weigh 500 pounds.

In a talk over meters vs. flat rates, it was generally conceded that there is need for better meters than any that have thus far been invented.

Prof. Mendenhall suggested the co-operation of the Association on a very important point, that of securing Congressional action to legalize the seven electrical units adopted by the Electrical Congress held in Chicago while the World's Fair was in progress.

The convention throughout was marked with great good feeling, was intensely interesting, and we dare say will prove productive of liberal and lasting results.

The following officers for the ensuing year were elected: President—M. J. Francisco, Rutland, Vt. First Vice-President—C. H. Wilmerding, Chicago, Ill. Second Vice-President—Frederic Nichols, Toronto, Ont. Executive Committee—Chas. R. Huntley, Buffalo, N. Y.; A. J. Markel, Hazleton, Pa.; W. W. Carues, Memphis, Tenn.

Notes of the Great Exposition.

The volume of mail passing from the bureau of awards, now located in this city, would indicate that thousands of official copies of awards were being sent forth to exhibitors.

A miscellaneous lot of articles, including wines from France, bamboo from Java, fish from Norway, statuary from Italy, sedan chairs from Turkey, etc., were recently picked up by relic hunters at a sale at the grounds.

It is estimated that \$7,000,000 was paid to Midway attractions, over 1,600 foreigners being employed as salesmen and musicians. The largest importers were the Turkish village people, with the Irish Industrial Association second.

About three and one-half million unsold admission tickets to the Fair were recently sold in Chicago, bringing \$11,000. They will be resold as souvenirs. There are eleven different styles of these tickets, and the price paid by the speculator approximated the original cost.

The 852 international judges of awards made over 250,000 examinations of articles entered for award. The articles were presented by 65,400 exhibitors. The number of awards bestowed aggregated 23,757, or 36 per cent, the smallest per cent in the history of any national exhibition.

Persons who purchased stock at a time when it was necessary to raise money to make the exhibition a success will have \$1,200,000 divided among them, this being the surplus after all obligations have been paid. The payment, which will soon be made, will amount to about 13 per cent of the subscriptions.

The South Park Commissioners, who now own the World's Fair buildings, have been offered \$15,025 for the agricultural, transportation, electricity, mines and mining buildings and machinery hall. Dion Geraldine, who superintended the construction of all the main buildings, has offered \$10,000 for the manufacturer's building. One wrecking company has tendered \$15,601 for twenty of the buildings.

The first controller of the treasury has decided that the executive committee of the World's Columbian Commission is not authorized to pay Prof. O. V. Tousley, national commissioner for Minnesota, \$5,000 per year to compile the history of the great Fair. He also holds that the resolution of the same committee reducing salaries of employees of the bureau of awards is binding on the bureau.

The hundreds of umbrellas, handbags, wraps, coats, jewelry, etc., left about by careless visitors, and picked and taken to the "lost and found" department, will soon be sold to the highest bidder. This curious collection, mixed up with plug hats and false teeth, together with unremoved exhibits of foreigners, who preferred to leave the latter rather than pay the duty, will be offered at the same sale.

The 25,000 persons who paid 10 cents each to kiss the stone in Blarney Castle on the Midway Plaisance, World's Fair, will no doubt be amused when informed that the rock was not brought from Ireland at all, but was simply a piece of lime stone taken from one of the streets of Chicago. This fact has been unearthed by treasury officials in checking up the return customs duty on Countess Aberdeen's Irish village.

Augustus St. Gandens, the designer of the Columbian medal, has submitted two modifications of the original design to the Secretary of the Treasury. This is in keeping with the desire that the male figure typifying America be relieved somewhat of its nudity. One of the new designs secures this effect by a shield in the hands of the figure; the other by a ribbon held by the youth. The members of the quadro-centennial committee of the Senate who have examined the new designs find the same objections as they did to the original. The matter is entirely in the hands of the Secretary of the Treasury and he has not yet given the subject consideration.

Patent Decisions and Notes.

In the case of Harry H. Jones, who applied for a mandamus to compel the Commissioner of Patents to issue him letters patent in two cases for improvement in belt fastenings, Judge Bradley, in Circuit Court, rendered a decision dismissing the petition, declaring that the Commissioner had acted within the discretion and authority possessed by him under the law, and that, therefore, the petitioner had ample redress through an appeal to the Court of Appeals. The cases involved the right of a Commissioner to reverse the decisions of his predecessor as to patents already granted and in the process of examination.

Attorney General Olney has rendered an opinion to the effect that the international copyright act of March 3, 1891, does not prohibit the importation of uncopyrighted lithographs, although these lithographs may be copies of copyright paintings.

Attorney General Olney recommends against recent propositions that Congress direct the Commissioner of Patents to investigate the Berliner telephone patents, as precisely the same investigation is now going on in the suit of the United States vs. the American Bell Telephone Company.

The following is the syllabus of decision in case of Myer vs. Dr. B. F. Bull Vegetable Medicine Company, U. S. Circuit Court of Appeals, Seventh District, appeal from the U. S. Circuit Court, for the Eastern District of Wisconsin:

Decision of the court that descriptive words, like "Cough Syrup" can not be appropriated as trade-marks. Nevertheless they may be used for the purpose of perpetrating a fraud which affects the public, and in which cases a court will, as against the fraudulent party, afford relief to the party injured. Upon the question of the right to use one's own name in trade the court holds that while this can not be denied in connection with his business or in the sale of articles of his own production, so as to show the business or the product to be his, yet he is not allowed to designate his article by his own name in such a way as to cause it to be mistaken for the manufacture or the goods of another already on the market under the same or a similar name.

The following is the syllabus in the case of Pacific Cable Railway Co. vs. Butte City Street Railway Company—U. S. Circuit Court, Ninth Circuit, District of Montana:

Patent No. 181,817, issued to Joseph Britton September 5, 1876 shows, and describes two turntables for cable railways, which are designed to be operated together. Held that, although one of the claims of the patent could be construed to cover the construction of one of the tables regardless of the other table, yet inasmuch as the patent contains no description of how one of the tables by itself can be operated, the claim for the construction of one of the tables will not be sustained.

Where a patent shows and describes a duplicate construction, but contains no description of the manner in which one of the members of the construction can be used, and the defendant is using one member only, the bill will be dismissed.

Where claims of a patent are not supported by a description in the patent, such claims are of no validity.

In the case of Butte City Street Railway Company vs. Pacific Cable Railway Company, for an infringement of patent for improvement in street cable railways, issued to Andrew S. Halladie, and assigned to appellee, the court decided the patent void for "want of invention."

POWER OF AGENT IN PATENT RIGHTS.—A power of attorney which, in consideration of a prescribed royalty, appoints the donor sole agent in the United States "for the purpose of working and developing the business of said patents," with power to "negotiate the sale of the said patents upon terms to be agreed upon," creates a mere agency, not coupled with an interest, and gives the agent no right to convey or assign the patents without the assent of his principal. The above decision was rendered in the case of the Johnson Railroad Signal Company against the Union Switch and Signal Company, (Circuit Court, W. D. Penn., 59 Fed. Rep. 20.) for infringement of letters patent No. 241,246, issued to Frederick Cheesewright. Cheesewright by a power of attorney, the provisions of which are set out in the opinion, constituted one Yeomans his attorney in fact in the matter of the patent, and defendant claims under a conveyance by Yeomans, dated March 21, 1882. Plaintiff claims title to the same patent under a power of attorney from Cheesewright to Henry Bezer, dated October 31, 1889, and an absolute assignment of the patent from the latter. The case was heretofore heard on motion for leave to file a cross bill, and for an order for substituted service. (43 Fed. 331.) Afterward, a motion by the cross complainant for an injunction was denied. (51 Fed. 85.) Decree is now rendered for complainant.

SCIENCE FOR YOUNG PEOPLE.

Conducted by E. P. LEWIS.

If a drum is struck, the elastic skin stretched over it vibrates up and down. As it moves upward, it compresses the air above it, and the pressure is passed forward from one air particle to another. When the membrane moves downward, the pressure above it is diminished, and the molecules of air begin to move backwards. In this way a vibratory motion, like that of a swinging pendulum, is given, first to the molecules around the drum and then through them to more distant particles. When these "waves of rarefaction and of condensation," as they are called, reach our ears they strike thin elastic membranes like those in a drum head. These begin to vibrate, and we say that we hear the sound of the drum. This is the way that sound is carried, and it can be carried only by the vibrations of some material substance. If a bell is rung inside the receiver of an air pump the sound will grow less and less as the air is exhausted.

In air sound travels about 1100 feet every second, and in solid bodies much faster. If there is no regularity about the sound waves that reach the ear we say that they produce a noise, but if they are at equal distances apart they produce a musical note, if twenty or thirty or more reach the ear every second, so that the separate sounds cannot be distinguished. The pitch of a musical note depends on the number of vibrations per second. In traveling on a railroad train you must have noticed that the whistle of a locomotive as it rapidly approaches is very shrill, but becomes much deeper after it has passed. The reason is that when it is approaching you are running into a set of sound waves, and so meet more of them every second. After the engine has passed you are moving away from them, and fewer overtake you. If you were to travel at the rate of 1100 feet a second, the same sound wave would be constantly traveling along side of you, and you would hear nothing, as the sound is due to the motion of waves against the ear drum.

A still more curious thing would happen if you could travel away from a band which had been playing some time with a speed twice as great as that of sound. You would hear the music all in correct tune, but backwards, as you would be overtaking the sound waves at a rate equal to their own ordinary speed, so the effect would be the same as though they were coming toward you.

* * *

Experiment shows us that sound does not travel in a vacuum. We have a good many strong reasons for believing that light is produced by wave motions something like those of sound, but very much faster, for light travels about 186,000 miles every second. If there are waves there must be something in which they move. The name ether has been given to the invisible fluid filling all space, and which transmits waves of light, heat, and electricity, which we now know to be the same thing, the different effects produced by them being due to the different sizes of the waves. In just the same way that the musical character or pitch of a sound depends on the number of vibrations in a second, so does the color of light depend on the number of vibrations which reach our eyes every second. About 395,000,000,000,000 waves of red light and about twice that number of violet light reach the eye every second—numbers entirely too large for our minds to grasp. If you look through a glass prism at a narrow slit through which light passes, or if we throw light on the wall by reflection from a mirror placed in an inclined position in a basin of water, so that the water itself acts as a prism, you will see a long spectrum, as it is called, composed of different shades of the colors red, orange, yellow, green, blue and violet in regular order. Each color is bent or refracted to a different degree by the prism, and the spectrum is due to an immense number of images of the slit, each of a different color side by side. If we examine the spectrum of sun light closely we will find that it is crossed by a large number of dark lines. This

means that certain colors are missing so that there is no colored image of the slit in the corresponding position. If we burn different substances in an electric arc and examine the light through a prism, we will find that only a few colors are produced, so that we see a number of separate lines. For some substances, such as iron, there are many hundreds of these bright lines. If common salt is burned, there are two very bright yellow lines close together, besides a number of smaller ones, all due to the metal sodium which forms a part of salt. If you compare the spectrum of any burning metal with that of the sun, you will find that the bright lines in the former nearly always correspond exactly in position with the dark lines of the latter. Again if you burn salt in a gas flame and allow light from an electric lamp to shine through it and pass through a prism, instead of two bright yellow lines you will see two dark lines. This means that the sodium when vaporized absorbs exactly the same kind of light that it gives out when it is heated much hotter. The colder vapor in the gas flame, which itself gave out yellow light, absorbed the same light from a brighter electric arc. This teaches us that the dark lines in the sun's spectrum are caused by the metallic vapors floating in its atmosphere absorbing certain kinds of light from the hotter body of the sun. This enables us to discover that many substances known to us exist in the sun. This method of detecting different substances is called spectrum analysis, and is the most delicate method known. All the different metals have been studied and the bright lines in their spectrum mapped, so that if we burn any unknown substance, by comparing the bright lines with the maps, we can discover the smallest trace of these substances.

* * *

We have seen that if we move toward or from a source of sound, the musical pitch is changed. Since color of light as well as pitch of sound depends on the number of waves that reach us every second, the light coming from any bright object ought to change in color as the object changes its distance. But light travels 186,000 miles every second, so that the object must travel very fast for us to see the change. It has been seen, however, in studying the spectrum of some stars. In such a spectrum, just as in the case of the sun, we see certain dark lines which have been absorbed by the vapors in the star's atmosphere. If the star is going rapidly away from us, fewer vibrations will reach us, so the lines will be shifted toward the red end of the spectrum; if it is coming toward us, they will be shifted toward the violet end. Not only can it thus be told whether a star is coming toward the earth or going away, but its speed can be calculated to a fraction of a mile. These calculations can be verified in the case of the planets, whose speed is well known from other facts, showing that the method is an accurate one.

* * *

It seems wonderful that the velocity of light and the length of its waves can be measured accurately. The measurement is really a simple thing, and depends on the same principles used by a surveyor when he measures a field.

An Early Electric Motor.

In adjoining cases in the National Museum are three objects which not only attract attention because they mark three great advances in human progress, but which have the added interest which comes from local associations.

One of these is a model of the quaint little locomotive "Tom Thumb," built by Peter Cooper. It was the first steam engine used on the Baltimore and Ohio railroad, and made its trial trip August 28, 1830. In another case is the telegraph instrument which recorded at Baltimore May 23, 1844, the words "What Hath God Wrought," the first telegraph message sent from Washington over the first telegraph line in the world, built along the Washington branch of the Baltimore and Ohio. These two objects have often been described, but about the third little has been written. It is a little model of an electromagnetic engine made by Charles Grafton Page, which

according to an inscription on it, was the first motor that ever propelled a railroad car. Page was a physiast and inventor of great merit, who has not received the credit that his work well deserved. He was born in Salem, Mass., in 1812, and in his boyhood showed great fondness for scientific studies, especially electricity. When only nine years old, inspired perhaps by Franklin's example, he was found on the roof during a thunder storm trying to draw lightning from the clouds with a fire shovel, but he was rescued before his experiment met with success. He graduated at Harvard in 1832, and then studied medicine. He still carried on his scientific work, and about 1841 he became a principal examiner in the Patent Office. From 1844 to 1849 he also held the position of professor of chemistry in the Columbian College, and died in Washington in 1868. He investigated the newly discovered field of electromagnetic induction, and independently invented the induction coil long before the idea occurred to Ruhmkorff, after whom the instrument was named. Most of his later work was in the line of the application of electrical power to transportation and culminated in the machine whose model is now in the Museum.

He first made several forms of electromagnetic motors, with which he ran lathes and other small machinery, from some of them obtaining more than 7-horse power. These, as well as his latest machine, resembled a steam engine in their design. About 1850 he secured an appropriation of \$30,000 from the Government to enable him to carry out his experiments on a larger scale. He then constructed a more ambitious machine. Its moving parts consisted of two parallel soft iron rods 3 feet long and 6 inches in diameter, fastened together, but some distance apart, by a cross bar, which was connected by a rod with the crank driving the wheels. These rods played with a stroke of two feet in two pairs of horizontal coils through which currents of electricity alternately passed, the contacts being made and broken by an eccentric on the driving shaft, just as the eccentric rod in a steam engine opens and closes the port holes in the cylinder. The iron bars played the part of the piston rods in an engine, being sucked into first one and the other of the pairs of coils by the magnetic attraction of the current.

After several preliminary trials, the final test was made on the Baltimore and Ohio railroad track April 29, 1851. The engine, with its battery of 100 Grove cells and 7 passengers, weighed about 11 tons. It made the trip to Bladensburg, 5 miles distant in 39 minutes, including five stops, and the entire trip in less than two hours. The maximum speed attained was 19 miles an hour, and about 8-horse power was developed. The jolting due to the heavy oscillating parts broke a number of battery cells and injured others, so that the trial was not an entire success. This was the last test made, as the Government appropriation was exhausted. The time was not then ripe for this method of transportation, as the production of current by chemical means was too expensive. But Page had demonstrated the possibility of the successful application of electricity as a motive power, and was confident that at some future day it would come into general use. He also realized the mechanical imperfections of his motor, and suggested the change of its reciprocating into rotary mechanism, perhaps having in mind something like the motor of the present day.

E. P. LEWIS.

New System of Reducing Garbage.

At a recent test of the Anderson garbage reduction system, in Chicago, twenty-four cubic yards of refuse were reduced to one and one-half cubic yards in fifteen minutes, with only six per cent of ash and other matter remaining unincinerated. This new method contemplates the reduction of city garbage and the application of the refuse to fertilizing purposes. The crematory consists of an oven in tunnel form. Wagons loaded with garbage are run into this tunnel, and intense heat is sustained by a continuous supply of crude petroleum under high atmospheric pressure. The wagon loads of garbage, after ten or fifteen minutes exposure to this intense heat, are withdrawn and the ashes and other unburnable matter is subjected to an ammonial induction, by automatic methods, and then becomes valuable as a fertilizer. The test of this new system is said to have produced the best results yet obtainable in the reduction of city garbage.

NEWS CONDENSED.

FEB. 28.—The Iowa senate rejects woman suffrage bill. Two thousand unemployed men at Toronto, Canada, went to the home of the mayor and governor and demanded work or money. Judge James W. McDill, of the Interstate Commerce Commission, died at Creston, Ia. Judge Cox, at Washington, D. C., declined to issue a mandamus to prevent the Pension Commissioner from reducing the pension of Judge Long, of Michigan, after thirty days' notice. Joseph Donjan was convicted in the United States Court at Baltimore of sending a threatening postal card to Vice-President Stevenson, and was sentenced to eighteen months imprisonment. The House of Lords refused to accept the House of Commons' rejection of Lord Salisbury's amendment to the Parish Councils bill.

MARCH 1.—Champion Corbett, tried for prize fighting, was acquitted at Jacksonville, Fla. Judge Barrett refuses a stay of proceedings and "Boss" McKane enters Sing Sing. The Bland seigniorage bill passes the house by a majority of 39. Librarian Poole of Chicago University, died at Evanston, Ill. The election in Brazil was very tame, resulting in election of Moraes. Congressman Wilson pronounced out of danger. India announces a new tariff of 5 per cent on imports with cottons excepted. Zachariah T. White was fined \$200 and costs at Nebraska City, for hanging Secretary J. Sterling Morton in effigy. Ex-Governor John C. Downey, of California, died at Los Angeles, aged sixty-seven.

MARCH 2.—Galusha A. Graw was sworn in as member-at-large of the House from Pennsylvania. The Pope celebrates his 84th birthday. Representative Dunphy writes a scathing open letter resigning from the general committee of Tammany Hall. Gen. Jubal A. Early, noted confederate general, died at Lynchburg, Va. Carnegie & Co., are assessed damages at \$140,484.94 by President Cleveland, for furnishing armor plate alleged to be below standard. At Minneapolis Frank Scheig, teller of the Bank of Minneapolis, confessed that he robbed the bank of \$123,000. The strike among the silk weavers at Paterson, N. J., is spreading. Congressman Dunphy, of the Eighteenth New York District, has resigned from the Tammany General Committee because of illegal election practices by the Hall.

MARCH 3.—Premier Gladstone resigns, and Lord Roseberry is summoned to Windsor Castle, by the Queen, to take his place. Commissioner Lochren takes issue with the law, and says a pension is a bounty, and not a vested right. The Rev. W. P. Ratliffe, a Populist member of the Mississippi Legislature, shot and killed S. A. Jackson, a Democratic member, at Kosciusko, Miss.

MARCH 4.—Charges of conspiracy on the part of government officials, against the Carnegie Company in the armor plate matter, are made by the *Pittsburgh Times*. James Montgomery Bailey, the "Danbury News Man" dies of pneumonia. Silver reached the lowest price in its history, 58 3/4. Attorney-General Olney has given an opinion that the Commissioner of Pensions cannot under any circumstances, even if evident fraud, suspend a pension until after thirty days' notice. Dr. William H. Burk, of the Philadelphia *Ledger*, died. More than 300,000 persons joined in a demonstration in Buda-Pesth in favor of the Civil Marriage bill.

MARCH 5.—Official advices received of restoration of peace in Central America. Both houses of the English Parliament are prorogued. The two hundredth anniversary of the removal of the Capital of Maryland, from Saint Mary's to Annapolis was celebrated with great pomp at Annapolis. Rev. Talmage withdraws his resignation as pastor of the Brooklyn Tabernacle. The United States Supreme Court reassembled at Washington; Justice Jackson was absent and Senator White was not sworn in. Fire at Deadwood, S. D., destroyed 32 buildings; loss over \$150,000. Judge Samuel B. Hoyt, who during the war was a commissioner of the Confederate States, died Sunday evening at Atlanta, Ga. Parliament was prorogued.

MARCH 6.—At Sing Sing, N. Y., several persons were injured in a wreck of an unmanageable trolley car. In an election row at Troy, N. Y., Robt. Ross a republican and Batt Shaw, a democrat were shot dead. Ex-Congressman Rufus S. Frost of Massachusetts, died in Chicago, en route home from a trip to Mexico. In the town elections throughout the State of New York, the republicans made great gains. Ex-President Harrison, delivered his opening lecture at Stanford University, Menlo Park, Cal. Senator Chandler of New Hampshire, announces his candidacy for reelection. Brayton Ives accused Henry Villard of again aspiring to control the Northern Pacific Railway. The Virginia legislature passes the Australian ballot law. Bishop John A. Paddock, died at Santa Barbara, Cal.

MARCH 7.—The Methodist Conference decides in favor of local option for Maryland. The pension bill passes the house. Governor Foster appoints Newton C. Blanchard to succeed Senator White of Louisiana. The British steamer Olympia with 3,400 tons of sugar, was wrecked off Cape Hatteras. Perry Heath secures control of the Cincinnati Commercial Gazette. Illinois republicans announce that they will contest the apportionment of the state made by the last legislature. The President sent three letters of Minister Willis to the Senate; a new constitution and a new form of government are proposed for Hawaii. As a result of an agreement reached at Bellaire, Ohio, about 7,000 coal miners will go to work at once.

MARCH 8.—The celebrated \$50,000 breach of promise suit of Miss Pollard against Congressman Breckinridge in Washington begins. Daniel Coughlin on his second trial was acquitted by a jury at Chicago of the charge of complicity in the murder of Dr. Cronin on May 4, 1889; the trial began October 30, 1893. Anarchists exploded a bomb nearly in front of the Italian Chamber of Deputies in Rome, seriously wounding eight persons.

MARCH 9.—Secretary Herbert awards the contract for floating the Kearsarge off Roncador reef for \$45,000. Cardinal Leon Bevoit Charles Thomas, Archbishop of Rouen, died in Paris. A meeting of workmen is held in Philadelphia, having for its object the sending of a delegation to Washington, April 6th, to protest against the passage of the Wilson bill. Hoadly B. Ives, the millionaire New Haven banker, became violently insane. Maj. Wm. Nevins, the veteran bandmaster, died in Chicago. He was a drummer boy in the Mexican war. The number of pensioners on the Government rolls is now approximately 966,000, against 952,000 for the corresponding week last year. British merchant vessels at Rio are being protected by the American fleet in securing fresh water and landing their sick owing to the inactivity of the British warships.

MARCH 10.—In a boxing contest at the Chicago Athletic Club, A. W. Crane was knocked senseless and died soon after. In the primary election held in the Second Congressional district of Tennessee to nominate a republican candidate for Congress, Judge H. R. Gibson won over John C. Houk. It is announced that Governor Penneyer of Oregon, will be the candidate of the Populists to succeed Senator Dolph. Peixoto's fleet anchors outside the harbor of Rio de Janeiro, preparatory to an attack on the rebel fleet. Mrs. Ben Perley Poore, died at the Ebbitt House, Washington.

MARCH 11.—As a result of the Moody and Sankey revival meetings in Washington, over 4,000 new converts are announced. It is announced that on the 15th, inst., the Johnson Steamship Company of Liverpool will establish a line of whaleback steamers in connection with the Baltimore and Ohio Railroad between Baltimore and the new port of Tampico, Mexico.

The Russo-German commercial treaty was adopted by order of the Czar. Judge Geo. W. Stone, Chief Justice of the Alabama Supreme Court, died in Montgomery. John Y. McKane is said to be short \$200,000 in his accounts with the town of Gravesend, Long Island.

MARCH 12.—The National Republican League is called to meet at Denver, June 26. Ex-Senator White of Louisiana, is sworn in as Associate Justice of the Supreme Court. The "On to Washington" crusade is organized by an eccentric man named Coxe at Massillon, Ohio. It is proposed to organize the "grand army" of unemployed, march to Washington, and demand employment from the government on roads and public works. Mr. Blanchard, of Louisiana, was sworn in as United States Senator. The bodies of the victims of the Gaylord mine disaster are finally recovered. The Wellman arctic expedition leaves Washington. John H. Mulligan, of Kentucky, was nominated to be Consul General of the United States at Apia. Lake navigation at Chicago was opened, being the earliest on record. The British Parliament reassembled; the Queen's speech declared that bills will be submitted for the amendment of registration, abolition of plural voting, dealing with church affairs in Wales and Scotland, equalization of London rates and local government for Scotland.

MARCH 13.—Da Gama, the Brazilian insurgent leader seeks refuge on a Portuguese warship and the trouble in Rio de Janeiro is suddenly ended without a naval battle. Lord Rosebery's statement on the "home rule" policy causes joy among the conservatives in England. The Ohio legislature passes the biennial session resolution, advocated by Governor McKinley. The U. S. steamship Marion encounters a terrible typhoon at sea and puts in at Yokohama for extensive repairs. Ex-Senator Chilton, announces his candidacy to succeed Senator Coke from Texas. Striking silk weavers at Paterson, N. J., rioted all day. The Youngstown, Ohio, street car strike has been settled, the men going to work at the old rate of wages, pending another conference on the matter. President Peixoto rejected Da Gama's terms of surrender; the government batteries at Rio opened fire on the rebel positions, but no reply was made; Forts Villaigaignon and Corbras and the insurgent vessels were abandoned by the insurgents. A sensation was created in British political circles by the House of Commons adopting by a vote of 147 to 145 an amendment offered by Mr. Labouchere to the Queen's speech declaring for the abolition of the House of Lords.

MARCH 14.—John T. Ford the veteran actor, died in Baltimore. The largest shipment of brandy ever made from an American port was made from San Francisco on bark J. C. Pilger, for German hospitals. The woman suffrage amendment was defeated in the Ohio legislature. At the special Congressional election in South Carolina, James S. Izlar, Cleveland Democrat, was elected over Stokes, Ocala Democrat. The fiftieth birthday of the King of Italy was celebrated.

MARCH 15.—The Bland seigniorage bill passes the Senate by 13 majority. The Wellman arctic party leaves New York. The bursting of a dam on Indian Creek near Boise City, Idaho, caused much damage to ranchmen in the valley. The fight against the city authorities of Denver by Governor Waite, results in great excitement. The governor calls out the state militia to oppose the sheriff and his deputies. Gen. McCook calls out United States troops to keep the peace. Emperor Franz Josef, is petitioned to grant repatriation to Louis Ksham the Hungarian patriot, dying in exile. Admiral Benham, is ordered to Bluefields with a United States man-of-war. Chief Justice B. J. Lea of the Tennessee Supreme Court, died in Memphis. The Rhode Island State Republican Convention renominated Governor Brown. The Union Label League of Cigar Makers, representing 31 unions and 4,000 members, met at Peoria, Ill., and adopted a protest against the increase of the tax on cigars. The general elections were held in Nova Scotia, and resulted in the return of 24 Liberals and 14 Conservatives.

MARCH 16.—The German reichstag finally passes the Russo-German commercial treaty. The controversy between Governor Waite and the police commissioners of Denver has been referred to the Supreme Court of Colorado for decision. Oregon Populists nominated Nathaniel Pierce for Governor on the Omaha platform. The Iowa Legislature defeated the Local Option bill. The coal miners at Montgomery, W. Va., have declared the strike off. The proposition to revise the French constitution has been shelved by a vote of 326 to 205; a proposition that the Senate be elected by universal suffrage was rejected by a vote of 415 to 67.

MARCH 17.—Fire in Gloucester, Mass., destroys the Ferguson block; loss \$125,000. Commander J. S. Coxe of the "Commonwealth" Army, Massillon, Ohio, declares he will march into Washington, at the head of half a million men. The Socialist Labor party of Rhode Island, place a state ticket in the field headed by Chas. G. Baylor for governor. Governor Waite of Colorado, finally concludes to submit to the Supreme Court decision. Governor Waite ordered the State troops to march upon Cripple Creek to suppress disorder among the miners there. Oxford easily won the annual boat race with Cambridge on the Thames.

MARCH 18.—Six persons are killed and many injured by a cyclone at Longview, Texas. The union depot at Denver, Col., burned; loss \$300,000. Joseph L. Magee, a New York lawyer is held to await the action of the coroner's jury in the case of the mysterious death of the handsome typewriter, Miss Martha Fuller, in the law office of Wm. Mullan. Mrs. Elizabeth Noble, wife of ex-Secretary of the Interior Noble, died at St. Louis. Michael Davitt, in an address at a meeting at Ballybrothy, Ireland, said he was convinced that Lord Rosebery was as firm a home ruler as any Gladstonian.

MARCH 19.—Miss Esther Jacobs obtained a verdict of \$50,000 in her breach of promise suit against Henry B. Sire, of New York. Commodore Wm. Danforth Whiting, retired, of the U. S. Navy, died at his home in New York. The U. S. steamer San Francisco sails from Rio for Bluefields. Banker Ives of New Haven, Conn., who went violently insane a few days ago, died. The Bland silver seigniorage bill is sent to the President.

MARCH 20.—The 90th anniversary of the birth of Gen. Neal Dow, the American temperance advocate is celebrated in many districts in England as well as the United States. Secretary Gresham gives the information to Congress that an explicit declaration has been received from the British government that nothing in the way of a protectorate over the Mosquito Indians is desired or intended by the British government. Louis Kossuth, the Hungarian patriot, died in exile at Turin, Italy. Great damage by storms and floods reported from the Mississippi Valley. The Michigan Supreme Court upholds the action of Governor Rich in removing certain State officials for gross negligence in failing to personally canvass the returns on the salaries amendment election of 1893. The tariff bill is reported to the Senate by Mr. Voorhees. The dangerous illness of Senator Colquitt is announced.

MARCH 21.—The Supreme Court of New Jersey, decides in favor of the republicans on the question of Mr. Adrian's title to a seat in the state senate. A successful test of the new monster 13-inch guns was made at Indian Head, witnessed by a large number of government officials and Congressmen. Another severe storm after several weeks of warm weather is reported from the West. The Illinois Supreme Court refuses to interfere to save murderer Prendergast from the gallows. Ferdinand Ward of New York, was married to Miss Belle Storer of Staten Island. Violent snow storms rage in Germany.

MARCH 22.—Senator Kyle says he expects to see Coxe bring 50,000 men to Washington. Commander Heverman is placed on trial by court-martial, in New York to decide the blame for

the loss of the Kearsarge. Students in Buda Pesth, Hungary, theaters to close and mourn the death of Louis Kossuth.

MARCH 23.—A stay of proceedings is granted to enquire into the sanity of Prendergast, the murderer of Major Harrison, condemned to hang this morning. By an explosion of dynamite at the works of the Acme Powder Company, in the Allegheny Valley at Black's Run, five men were killed. A blizzard in the northwest was the worst of the season. F. J. Wilson & Co., finally win by the opinion of Attorney-General Olney on the validity of the Cherokee bond contract, that the Cherokee nation has the right to assign the \$2,000,000 bonds to Wilson & Co.

MARCH 24.—"Col." Redstone opens up Coxe headquarters in Washington and expresses a belief that 300,000 people will march to Washington. The Colorado Supreme Court holds against Governor Waite. Prendergast denies his alleged insanity. A new treaty with China is agreed upon, in which China reserves the right to legislate against American residents under certain conditions. Another severe blizzard visits the northwest and sweeps eastward and southward over the whole country, doing much damage.

MARCH 25.—Coxey's army departs from Massillon in a snow storm, with only 159 granks, tramps and notoriety seekers in line. Capt. Wilton, French aeronaut was drowned near Cannes.

MARCH 26.—Coxey's army at Canton, Ohio, dismissed with their leader who puts up at first class hotels and rides good horses, while the privates walk and sleep in jails and bars on hay. Judge Dallas in circuit court of appeals at Philadelphia, decides the sugar case in favor of the trust. Judge Wm. B. Kincaid, Secretary Carlisle's former partner, died at Lexington, Ky. Senator Colquitt, died at his residence in Washington.

MARCH 27.—Congressman Wilson is rapidly improving in health. He is now near San Antonio, Texas. Baranoff Castle, one of the most historical land marks in Alaska, burned. U. S. Commissioner Rogers, narrowly escaped with his life. E. W. Hudson, one of the founders of the New York *Herald*, died at Waburn, Mass. Great damage to crops in the South by the recent storm is reported. In accordance with a Senate resolution, Vice-President Stevenson sends a message of condolence to the family of Louis Kossuth. Coxey's army arrives at Alliance, Ohio, but Coxey returns to Chicago, as he says, to sell some horses. Many of the army have become disgusted and deserted. The death of Lovell Cameron, the African explorer, is announced. Maj. Bickham, the distinguished editor of the Dayton, Ohio, *Journal*, died.

MARCH 28.—Secretary Herbert denies the report of his contemplated resignation. Governor McKinley speaks in Minneapolis, and is given a huge ovation. Kentucky women petition for Col. Breckinridge's impeachment. Potter Palmer of Chicago, is dangerously ill. Coxey's army reaches Salem, Ohio.

MARCH 29.—President Cleveland vetoes the Bland seigniorage bill. George Ticknor Curtis, the eminent authority on constitutional law, died in New York. J. M. Ellis of Oberlin College died. The body of Hans Von Bulow, was cremated. Congressman Wilson is weaker. Gov. Northern appoints Speaker Crisp to succeed the late Alfred H. Colquitt, Senator from Georgia. The Maryland legislature has passed the bill providing medical treatment for confirmed drunkards. Opinions on the veto of the seigniorage bill indicate great dissatisfaction among southern and western democrats.

Books and Magazines.

Electrical and Street Railway Reporter, is the name of a new monthly publication in New York. Typographical excellence and editorial ability are marked features of the first issue. It publishes an exhaustive report of the proceedings of the recent meeting of the National Electric Light Convention in Washington. The subscription price is \$5 per annum.

Stone, an illustrated monthly magazine, published in Chicago, is one of the most valuable publications for contractors and builders in the country. The March number was a particularly interesting number, and contained the third paper on "Problems in Stone Cutting," by Ed. W. Hind.

One of the most interesting and logical arguments against prohibitory liquor legislation appears in the March *Popular Science Monthly*, furnished by Mr. Appleton Morgan. He denounces these laws as ineffectual and a hindrance to wiser and more efficient regulation of the traffic.

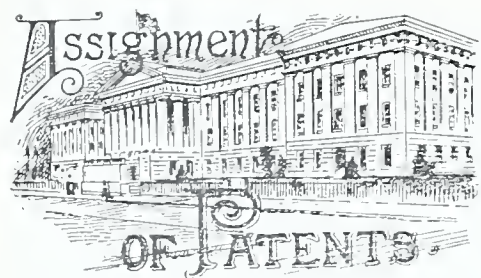
"The Story of the World's Parliament of Religions" is told by Rev. F. Herbert Stead in the *Review of Reviews* for March. Mr. Stead groups together the significant utterances of various representatives, who took part in the proceedings of the World's Parliament of Religions, some of which throw a new light upon the faith and beliefs of Eastern Europe and Asia.

SOME SALIENT POINTS IN THE SCIENCE OF THE EARTH.—One of the most interesting works on geology that has been issued during the present century, has just been published by Harper Bros., under the cumbersome title of "Some Salient Points in the Science of the Earth," by Sir J. Wm. Dawson, of Montreal, who has contributed his full share to the limited knowledge of the race concerning the birth, development and possible fate of our planet; but we find that the most of his writings are made up of mere speculations. On every page he qualifies a statement with a "perhaps," "it is probable," "I think," or "I believe that such and such is the case." He cites no proof in many cases, because there is none to cite, but he frequently takes issue on important points with savants who have held opinions that are diametrically opposed to his own. Still, he is very seldom dogmatic, and we can forgive him much.

As a specimen of his better style, we quote the following from his chapter on "World Making": "In human history we are dealing with the short lives and limited plans of man. In the making of worlds we are conversant with the plans of a Creator with whom one day is as a thousand years, and a thousand years as one day. We must not measure such things by our microscopic scale of time. Nor should we fail to see that vast though the ages of the earth are, they are parts of a continuous plan, and of a plan probably reaching in space and time immeasurably beyond our earth. When we trace the long history, from an incandescent fire mist to a finished earth, and vast ages occupied by the dynasties of plant and animal life, we see not merely a mighty maze, an almost endless procession of changes, but that all of these were related to one another by a chain of causes and effects leading onward to greater variety and complexity, while retaining throughout the traces of the means employed. The old rocks and the ancient lines of folding and the perished forms of life are not merely a scaffolding set up to be thrown down, but the foundation stones of a great and symmetrical structure. Is it yet completed? Who can tell? The earth may still be young, and infinite ages of a better history may lie before it." (p. 35.)

Speaking of plants and animals, he says there is no fact to sustain the theory that they were introduced in embryonic form, and, we will add, *en passant*, that the whole book is a mild protest against Darwinism.

While this latest volume of Dawson has a flaw and a failure in almost every chapter, it shows that he is one of the profoundest thinkers of our time, and his book will take a place in all libraries with those of Huxley, Tyndall, Agassiz, and other classic writers in the world of science.



Under this heading is published all assignments of patents or partial interest in same, as on record in the United States Patent Office for the month ending March 19, where the consideration was \$2,000 and over.

Benjamin J. Abbott inventor, to T. M. Atkinson assignor, to the Chicago Metal Hardening Co., of Ill., Machine for Dressing Car Wheels; his whole right. Consideration \$25,000.

William Allen inventor, to Lewis H. Finch, Metallic Crook for Stone Boats; all rights. \$2,000.

Robt. M. Elliott inventor, to B. L. Phillips assignor, to the Electric Storage and Equipment Co., of Chicago, Ill., Electrodes for Secondary Batteries; all rights for U. S. \$250,000.

Charles H. Ferris inventor, to Wisley G. Markland, of Ocala, Fla., Kitchen Cabinets; all rights for ten states, and three territories. \$9,000.

Byran W. Fellows inventor, to the W. W. Fellows Machine Co., of Beverly, Mass., Propellers; all rights for the U. S. \$3,000.

Louis C. D. Homergue inventor, to Inez J. D. Homergue assignor, to the Cyloid Railroad Construction Co., Bicycle Railroads; all her right, title and interest for the U. S. \$5,000.

James Dawdy and Frank M. Cattern inventors, to A. D. Canning, Electro Medical Air Protector; all rights. \$1,000.

Charles Deplarity inventor, to Geo. L. Boswell, of Coffeyville, Kans., Window Screen; all rights. \$8,000.

Samuel F. Homley inventor, to Henry C. Meyer, and Thomas P. Henning, of Boonville, Ind., Clothes Washer; all his rights for six counties in Indiana. \$3,000.

John Hill inventor, to Neracher & Hill, Sprinkler Co., of Columbus, Ga., Automatic Fire Extinguisher; all rights. \$12,000.

Thomas J. Hatfield inventor, to Frank L. Wallin and others of Versailles, Ohio, Fanning Mills and Grain Separator; all rights. \$5,000.

Alfred B. Hill inventor, to W. F. Gregory, and C. C. Hamrick assignors, to M. Cherry, and W. B. Glenn, Cistern Cleaner; all rights for the state of Texas. \$5,000.

Henrietta Horn inventor, to Ernest V. Pierson, of Newark, N. J., Adjustable Pattern for Drafting Garments; an undivided one-third interest. \$3,000.

Jacob R. Hoyt inventor, to W. H. Robbins, of Altoona, Iowa, Hanger for Clothes Line; all rights for the state of Minnesota. \$1,000.

Thomas Head inventor, to Edmund Ore assignor, to Geo. H. Hoerr, of Mankato, Minn., Graining Composition; all rights for a few cities and states. \$4,000.

William Hubartt inventor, to the Hubartt Ladder and Elevator Co., of Chicago, Ill., Fire Escape; all rights. \$75,000.

Charles D. Harsin inventor, to M. J. Scoville, of Des Moines, Iowa, Device for Transplanting Trees; all rights for the states of Ohio, Indiana, and Illinois. \$3,000.

Legrand B. Harmon and Jasper N. Nutt inventors, to Cary E. Harmon, Fence Post; all rights to manufacture for the U. S. \$3,000.

Albert E. Johnson inventor, to the National Sewing Machine Co., of Conn., Groove Cutting Attachment for Sewing Machines; all rights. \$1,500.

Ira L. Green inventor, to James M. Patterson and others assignors, to the Green Electric Signal Co., Railway Signal; all rights. \$30,000.

Fred. Girtanner inventor, to M. J. Blackwell, and V. V. Cochran, of Los Angeles, Cal., Straw Burning Attachment for Stoves; all right for 16 counties in Cal. \$5,000.

Aaron P. Gould inventor, to John L. Robb assignor, to John B. Michener, of Canton, Ohio, Attachments for Operating Elevator Gates, and Dust Collector; all rights. \$10,500.

Frederick Wolter inventor, to Richard Saalfeld assignor, to Wm. Mayer, of N. Y. City, Extension Table; all rights. \$5,250.

Isaac Wood inventor, to Henry F. Labbitt, and Walter C. Baker, Oil Burner; all rights for the state of Iowa. \$2,500.

James P. Weatherman inventor, to Jno. S. Taylor assignor, to Jerome Dickinson, of Greene Co., Mo., Grub Plows; all rights for the U. S. except Kansas and Texas. \$10,000.

Joseph L. Crain inventor, to R. J. Burns and H. L. Brickey, of Ava, Ill., Wire Stretcher; all rights for ten states. \$8,000.

Lucian Cook inventor, to Thomas B. Bryan, of Chicago, Ill., Transportation System; all rights. \$10,000.

Albert J. Kletzker and Jacob Ranz inventors, to the National Cigar Vending Machine Co., of Mo., Cigar Vending Machine; all rights. \$46,500.

Chas. M. Berry inventor, Ellsworth D. Middlekauff assignor, to Andrew N. Aitken, Bracket for Incandescent Lights; one undivided half of all rights. \$35,000.

Austin T. Bascom inventor, to J. C. Cummings, of Sidney, Ohio, Paper Feeding Machine; all rights. \$2,500.

Wm. B. Bonham inventor, to J. H. Brown assignor, to J. M. Hamilton and others, Harrow; all rights. \$6,000.

Franz Burger inventor, to Henry M. Williams,

Fort Wayne, Ind., Explosive Motors; three undivided fourths of the whole right. \$3,000.

Warren H. Boles inventor, to the Peerless Burnisher Co., of Syracuse, N. Y., Burnishers; all rights. \$23,000.

Mills and Mines Resuming.

Schenectady, N. Y., knitting mills, 150 hands; Easton, Pa., agricultural implement factory; Hammond, Ind., brick mill, 500 hands; Chester, Pa., woolen mills, 100 hands; Troy, N. Y., steel mills, 1,100 hands; Bethlehem, Pa., steel mills, 1,100 hands; South Chicago, Ill., blast furnace, 100 men; Scranton, Pa., glass factory, 500 hands; St. Louis, Mo., car works, 250 hands; Gallatin, Tenn., spoke and handle factory, 200 hands; Youngstown, O., iron furnaces; West Chester, Pa., iron works, 300 hands; Duluth, Minn., iron ore mine, 200 hands; Hurley, Wis., iron ore mine, 400 hands; Anderson, Ind., glass factory, 300 hands; Pittsburg, Pa., iron works, 800 men; Birmingham, Ala., blast furnaces; Mount Vernon, Ill., ear works, 500 hands; Philadelphia, Pa., yarn mills; Uxbridge, Mass., woolen mill, 200 hands; Millville, Mass., rubber factories, 1,400 hands; Newcastle, Pa., iron furnaces, 700 men; Aineyville, Pa., iron furnace; Peekskill, N. Y., stove works, 300 men; Zeeland, Mich., furniture factory; Connellsville, Pa., coke works, 600 men; May's Landing, N. J., carpet factory; South Walpole, Mass., emery mills; Norristown, Pa., woolen mills, 200 hands; Chester, Pa., woolen mills; Middletown, Conn., plating works; Pottstown, Pa., puddling mills; Hazleton, Pa., furnace; Pittsburg, Pa., steel works; Martin's Ferry, O., nail factory; Gadsden, Ala., lumber mill; Nicotack, Ga., woolen mill; Enterprise, Miss., knitting mills; Athens, Tenn., cotton mills; Bridgeport, Ala., lumber mills; Beaumont, Tex., lumber mills; Linden, Tenn., lumber mills; Ashland, Ky., lumber mills; Dambert's Point, Va., cotton mills; Claremont, N. H., woolen mills; Ashland, N. H., knitting mills; Centerville, R. I., woolen mills; Smyrna, Pa., shirt factory; Woonsocket, R. I., woolen mills; Phillipsbury, N. J., silk mill; cotton mill at Rome, Ga.; coal mines at Egypt, N. C.; saw mills at Frankfort, Ky.; mills of the Tennessee Furniture and Lumber company, Elizabethton, Tenn.; Winship Machinery company, Atlanta, Ga.; Clifton Iron company has blown in one of its iron furnaces at Ironton, Ala., after an idleness of two years; butt weld furnace at the tube works, Wheeling, W. Va.; Terra Alta woolen mills, Terra Alta, W. Va.; Rome Brick company, Rome, Ga., with 100 hands; Melrose Manufacturing company at Roanoke, Va.; Louisiana Cypress Lumber Mills company at Harvey, La., 250 men; furnaces at the La Belle mill, Wheeling, W. Va., and it is stated that the Wheeling Iron and Steel company will soon start the puddling department at its Benwood mill; Bibb miles, Macon, Ga., factory Nos. 1 and 2, on full time March 4, for the first time in many months. This means that 600 people who have been working on half time have gone to work on full time at old wages; No. 3 furnace of the Isabella Furnace company at Etwa, Pa.; Mount Hope Iron Works at Somerset, Mass.; Whiting Machine Works at Whitingville, Mass., employing 700 men; Friction Pulley and Machine Works at Sandy Hill, N. Y., night and day; McKee & Nilson Paterson, N. J.; woolen mills at Oregon City, Ore., employing 200 men; the Crown woolen mill company at Marcellus, N. Y., the largest of its kind in Central New York, with a force of 250 men; the Pennsylvania Steel company's plant at Steelton, Pa., employing over 4000 men; the Marshalltown, Del., Iron Works have resumed, employing 500 men; the Haskell & Barker ear works at Michigan City, employing over 1,000 men.

THE INVENTIVE AGE for May will be issued the last three days of April. An unusually large edition will be printed and several thousand copies will be sent abroad. A large percentage of those receiving awards at the World's Fair will be interested in this and succeeding issues of the INVENTIVE AGE, which is forwarded to any address in the United States for the ridiculously low price of \$1, and to European countries for \$1.50.

THE INVENTIVE AGE is anxious enough to desire the opinion of its readers as to its excellence. The rapid increase of its circulation would seem to indicate at least a measure of satisfaction.

Industrial Notes.

The Eagle mills at Woonsocket, R. I., are now being operated on full time.

The American Worsted Mills at Providence, R. I., are again running on full time.

The woolen mill at Putnam, Conn., employing 350 hands, has started up on full time.

The Hatch Cutlery Company is about to move from Middletown, Conn., to Taunton, Mass.

Orrell's woolen mill at Glendale, R. I., has started up again, ten per cent. cut in wages.

Navigation on the great lakes opened about six weeks earlier this season than the average.

The employees of the Pennsylvania Bolt and Nut Works accept the \$2.50 scale for puddlers.

The Chase Woolen Mills at Elmville are again in operation, with a reduction of 20 per cent. in wages.

The woolen mills at Hillsboro, N. H., are being operated again with a reduction of 10 per cent in wages.

Work has been resumed at the Addison Mills at Glastonbury. A reduction of 10 per cent was made in wages.

The Pueblo, Col., Steel Works are now employing 500 men and will soon increase the number to 1,000.

It is reported that a reduction of 20 per cent has been made in wages at the Eddy Electric Works at Windsor.

An increase of 10 per cent is announced in the wages of operatives in Phoenix Manufacturing Co.'s mill at Allentown, Pa.

It is announced that a reduction in wages amounting to 10 per cent. will go into effect at once in Howarth & Son's mills at Rochdale, Mass.

Two of St. Paul's (Minn.) largest manufacturers, the Northwestern Cordage Company and the Walter A. Wood Harvester Company, started up last month.

The works of the American Tin Plate Machine and Manufacturing Co., at Linfield, Pa., are in full operation again, the daily product being about ten tons.

The Fair Haven & Westfield Street Railway Company, Fair Haven, Conn., has contracted with the Westinghouse Company for the electrical equipment of the road at a cost of \$500,000.

A \$12,000,000 street railway contract for the building and equipping of an electric road about 100 miles long in Brooklyn has just been signed through the effort of William B. Boland of Boston, Mass.

What is said to be the largest fleet of coal boats ever sent to New Orleans recently left Louisville. It contained forty-eight barges, carrying about 40,000 tons, and covered eight acres of water.

It is given out that the Johnstown, Ohio, Steel Works, owned by Congressman Johnson, will be removed to Cleveland. The company proposes to equip the plant with a German steel process, by which the metal will be carried from the ore to the rail without remelting.

Gone Up in Smoke.

At Illion, N. Y., Hanser's furniture factory. Loss, \$10,000.

At Binghamton, N. Y., the electric lighting establishment.

At Racine, Wis., Belle City Malleable Iron Works. Loss, \$40,000.

At Newark, N. J., Stengel & Rothschild's leather factory. Loss, \$15,000.

At Tiffin, O. The Sneath Glass Works. Loss, \$30,000; insured for \$12,000.

At Harleton, Tex., Hope Company's mill. Loss, \$35,000; insured for \$18,000.

At Racine Junction, Wis., the plant of Racine Iron company. Loss, \$10,000.

At Philadelphia, Pa., Haney & White's sash and blind factory. Loss, \$100,000.

At Glen Falls, N. Y., the A. S. Rugge Shirt and Collar Factory. Loss, \$10,000.

At Dodge, Mich., the Lansing Lumber Company's plant. Loss, \$175,000; insured.

At Wyandotte, Mich., the plate mill of the Eureka, Iron and Steel Works. Loss, \$65,000.

At Gouverneur, N. Y., the Gardner Pulp Company's tale mill. Loss, \$50,000; insurance, \$25,000.

At Constable Hook, N. J., the Tidewater Oil Company's wax refining department. Loss, \$100,000.

At Ithaca, Mich., the C. W. Althouse Stave and Heading Mill. Loss, \$25,000. Insurance, \$12,500.

At Waycross, Ga., the Walerstown Saw Mill plant, owned by the Waycross Air Line Railroad. Loss, \$100,000.

At Manayunk, Pa., the Missonri Mill; making cotton yarns and dress goods. Loss, \$50,000; partially insured.

At Philadelphia, the big mill of Frederick Rumf & Bros., manufactures of table clothes and counterpanes. Loss, \$350,000.

THE INVENTIVE AGE desires to publish practical ideas from practical men and women and to that end urges upon those of its readers who are making new discoveries and who possess information of interest to our readers to send in communications from time to time, for publication.



Mayor Hopkins has vetoed the ordinances which grant to the Chicago City Railway Company the privilege of equipping for electric traction most of its lines now traversed by horse cars. The reasons assigned for the disapproval of these important measures are found in the mayor's belief that the city can make a better bargain with the company than that contained in the ordinances as they recently passed the city council.

The draw of the great bridge over the Big Muddy river at Omaha is now being swung by the Wandell-Entz storage battery.

At the instance of some of the principal electric light companies, the Canadian Government has decided to establish a system of inspection of electric meters similar to that already in force for gas meters. A bill for this purpose is to be introduced in Parliament at the approaching session.

The new Broad street station of the Pennsylvania Railroad at Philadelphia when completed will contain over a hundred miles of concealed electric wiring. About 53 miles of wire will be required for the electric lighting alone, which will be done with about 10,000 incandescent lights. Not a gas pipe can be found in the great structure, the sole reliance being on the electric light. In the waiting room alone there will be 2,500 lights, located principally in the ceiling, where they will be arranged in rows about the large square panels.

Perry Yarrington, president of the Chicago Electric Company, is under indictment at Chicago for embezzling \$10,000 from the gas company.

It is announced that the Metropolitan Traction Company has decided to equip one of its numerous lines in New York city with the Buda Pesth underground system, with a view to eventually substituting this form of motive power for horses on most of its lines if it gives satisfaction. On Broadway, where the traffic is heavy, it has been decided to continue the cable.

The Concord, N. H., Land and Water Power Company has for some months past been engaged in installing the first commercial multiphase transmission plant in the United States of the same character as the one used in the famous experimental tests between Lauffen and Frankfurt, Germany. This dam is 500 feet long, has a 22 foot head and a normal average capacity of 5,000 horse-power. The plant has a capacity of five pairs of turbines, giving 2,000 horse-power. At 10 o'clock a. m., February 28, the water was let into the canal for the first time, and in 80 minutes all the machinery was in motion, with no hitch of any sort.

Electricity generated while the train is in motion by means of a belt running down through the car to the axle of one pair of wheels, has been tested for car lighting on the Central Hudson Railway with fairly good results.

The Cataract General Electric Company has been chartered to supply electricity with which to operate boats. Thomas C. Platt, of the United States Express Company, New York; Charlton T. Lewis, counsel to the Mutual Life Insurance Company, of New York, and William Martens, of L. Von Hoffmann & Co., New York, are interested.

An application has been made to the Court of Chancery, Newark, N. J., by Thomas A. Edison and Col. E. Gourand for the appointment of a receiver for the Edison United Phonograph Company, on the ground that it is an insolvent corporation.

The city of Boston is now getting its streets lighting done for 35 cents per light, under a guarantee to use at least 2,000 lights.

An Extraordinary Offer.

THE INVENTIVE AGE has made arrangements whereby it can furnish the complete set of World's Fair views—220 in all—at a nominal figure. These views are not cheap wood cuts but fine half-tone cuts covering every important feature of the greatest of the world's exhibitions. THE INVENTIVE AGE one year, and this set of views will be sent to any address, postage paid for \$1.35.

Still another great offer is that of the People's Atlas of the world—maps and statistics corrected up to 1884—124 pages—maps of every state and every nation—a complete Atlas, with over 300 illustrations, usual price \$3 to \$5. We will furnish THE INVENTIVE AGE one year and send the Atlas to any address, postage paid for \$1.35. Reliable agents wanted in every county in the United States. Send for terms to THE INVENTIVE AGE, Washington, D. C.

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THE INVENTIVE AGE, Washington, D. C.

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE, which keeps inventors posted in the art in which they are mostly interested. — The full address of any patentee, and number of patent found below sent to any address on receipt of one 2-cent stamp. — We will send, postpaid, to any address, printed copies of any U. S. patents, with specifications and drawings, upon receipt of 20 cents for one copy; 45 cents for two copies; 50 cents for three copies. — (See premium offer elsewhere in this issue.) — Address THE INVENTIVE AGE, 8TH AND H STS., WASHINGTON, D. C.

LIST OF PATENTS

GRANTED FOR INVENTIONS.

FEBRUARY 20, 1894.

[See note at head of this list.]

Abdominal bandage. M Heath.
Acid, concentrating sulfuric. W Wolters.
Acid, making citric. C Wehmer.
Adding machine. S L Huizer.
Aerator. J W Dickison.
Air, apparatus for heating and medicating compressed. W S McLean.
Air brake coupling. W A and B S H Harris.
Air brake coupling, automatic. W A and B S H Harris.
Air compressor. P Brotherhood.
Alarm box, automatic. J H Smith.
Animal trap. N J Tanner.
Annunciator, electric. N M Watson.
Axle lubricator, carriage. F B Brock.
Bag or purse frame. L B ...
Bag tyer, automatic. H H Nelson.
Bags, making. R E Hunt.
Bailing press. J W Martin.
Band cutter, grain. G M Walker and A O Calhoun.
Barrel stand. M A Lockman.
Basket, fruit. T Cogswell.
Basket, metallic. L M Cabana.
Battery. D H Wilson.
Bearing for wheels, roller. W H Thompson.
Bearing, roller. J D Mattison.
Bearing wheel, roller. S D Wright and J W Hornsey.
Bed, spring. A E Beall.
Beer, making. J C Pennington.
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Bicycle. F Lillibridge.
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Bicycle mud guard. M E Griswold.
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Blind and ventilator, combined. H P Egedal.
Blower, rotary. T W Green.
Boat. J L Burton.
Boat detaching apparatus. H E Rottmer.
Bobbin and spindle. T Wrigley.
Boiler flue cutter. C H Albert and C Fox, Jr.
Boiler tester. L Kaczander.
Book backs, embossing. A Krab.
Book, memorandum sales slip. W M Kinard.
Book holder. J C Gooding.
Bottle cover or cap. A Assorati.
Bottle, nursing. R Turk.
Box corner binding. A A Wood.
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Boxes, machine for manufacturing. R Schleicher.
Brake. H Kleiman.
Bucket, coal handling. W G Curtis and J D Isaacs.
Buckle, back band. W J Ware.
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Bung. H A Lewie.
Bung, vent. R Schaefer.
Butter box or case. C L Sims.
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Can filling machine. H B Stickney.
Cannon, breech loading. S Seabury.
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Car coupling. W H Robinson.
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Car coupling. D K Slawson.
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Car fender, safety. W J Ogden.
Car indicator, electric. H C Beckman.
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Car seat. A Sekyra.
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Carbureting apparatus for gas or vapor engines. G E Hoyt.
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Carding engines, machinery for operating on conjoined staples for. W Greaves and J Wardle.
Carriage side door and seat combined. E Selen.
Cartridge elevating mechanism. F H Richards.
Castings, treating metal. H Heil.
Cattle guard. P L Brady.
Chain, drive. L W Loomis.
Chamber or other liquid receiving vessel. J D Rush.
Chart. E R E Cowell.
Chimney attachment, fire and water proof. A C Miller.
Churn. G A Rosson and C A Weaver.
Circuit making and breaking device. D H Wilson.
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Clutch. W Oesterleu.
Clutch, split pulley friction. L S Bache.
Coating metals with oxides. C R Arnold.
Coffee or tea pot condenser and dripper. J A McClellan.
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Coop. T Marr and J Graham.
Cores, adjustable chaplet holder for supporting and centering. F L Badger.
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Creamer, centrifugal. F O Nilsson.
Cultivator attachment. A Dyer.
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Cyclometer. I L Sheldon.
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Dental tool. F A Kotts.
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Door, coiled sliding. F A Schluns.
Door plate and memorandum slate. T White.
Door sealer. P Provonsa.
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Dredging machine. G H Titcomb.
Dresser, commode, &c. A K Hattberg.
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Dumping rack. W Underwood and C Prall.
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Dye, basic yellow. A Weinberg.
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Electrical converter. A L Riker.
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Sash holder. P K O'Leary.
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Stove. F L Voegtly and J Chroefel.
Stovepipe or flue cleaner. A Y Graham.
Stump extractor. E O Neil.
Surgical chair. J E Rouze.
Switchboard system. D H Wilson.
Swivel. F Salathe.
Syringe. C D Harsin.
Tack driving machine. E Woodward.
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Wool oiling product. E Godchaux.
Wrench. D H Carpenter.
Wrench. W Houghton.
Zinc, manufacturing oxid of. E O Bartlett.

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Adjustable and folding chair. W B White.
Air-brake apparatus. M L Rothschild.
Air-brake system. M L Rothschild.
Air-compressor, hydraulic. J H Champ.

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Armatures, electric ...
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Atomizer. J H S ...
Ballingspress. P C Southwick.
Bark-stripping machine. F H ...
Basin, and. C H Higgins.
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Beading, roller. W J ...
Beating and ...
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Ber-vets, apparatus for ...
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Bicycle. H B ...
Bicycles, &c. Z L ...
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Billiard-balls, fastening for leather ...
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Bolting-reel cloth fastening device. J W ...
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Bottle packing wrapper. J T ...
Bottle-stopper. T Schuler.
Bottle-stopper. A Sitzer and J Schaefer.
Bottle-stopper and ink-filler. R G ...
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Bottle-washer. T F ...
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Bridle-bit R Devereaux.
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Murray.
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Burglar alarm. H C ...
Lacey.
Butter-worker. F B ...
Can-heading machine. D D ...
Can-opener. D Earl and A Goodman.
Candle-extinguisher. P Curran.
Car-brake. G W ...
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Car-brake. H H ...
Car-coupling. D W ...
Car coupling. C B ...
Car coupling. P J ...
Car-coupling. F Enos.
Car-coupling. R F ...
Car-coupling. P M ...
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and T S ...
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Car fender, street. W H ...
Car fender, street. W P ...
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Car-street. T H ...
Car-vestibule. G Abel.
Car-vestibule. L S ...
Cars, ventilating railway. R M ...
Carburetor. J T ...
Carpet beater. C S ...
and F A ...
Cash register and indicator. G W ...
Cash register and indicator. W P ...
Chain, breast. W M ...
Chair. C N ...
and C W ...
Check hook. T A ...
Cheese, artificially enriching. P F ...
and E ...
Chimney attachment. T E ...
Chimney, sectional ventilating. S H ...
Cigarette-cutting machine. G F ...
Clock spring arbor bearing. F ...
Clothes line. F S ...
Clothes line pulley. J M ...
Clothes line support, adjustable safety. R ...
McNab.
Clutch, friction. M D ...
Cock, high pressure ball. H C ...
Coin operated device. C M ...
Coin operated lock. F ...
Coin receptacle. A W ...
Compound engine. W E ...
and G B ...
Peteche.
Cooking apparatus. J Plenske.
Cooking utensil. T W ...
Cooking vessel, combination. J ...
Cork extender. H H ...
Cork puller. E Walker.
Cork puller, automatic. E Walker.
Corkscrew. T Crelin.
Coupling device. J T ...
Culinary vessel handle. F J ...
Cultivator. H W ...
Cycle frame. A Perkins.
Detector bar operating mechanism. A H ...
Johnson.
Display counter. W L ...
and R A ...
Distilling apparatus. F E ...
Pitching machine. W L ...
Door frame, screen. A F ...
Door fastener. H Kapple.

- Door hanger wheel. E Y Moore.
 Douche bath. O A Grafstrom.
 Draft equalizer. W Eikenbary.
 Draft regulator. J T Lawler.
 Dredging machine. G H Titcomb.
 Dry kiln. W P Murphy.
 Drying and cooling apparatus for grain, &c. G W Bisbee.
 Drying tea, sugar, &c., apparatus for. E Robinson.
 Dye, brown. M Ulrich, J Bammann, and M Herzberg.
 Dye, gray. A Israel and K Pathe.
 Dynamo current collector. C R Roberts.
 Eccentric. F M Wargach.
 Electric heater. A S Hatch.
 Electric heater. S E Nutting.
 Electric machine, dynamo. J Wenstrom.
 Electric motor. C Doriot.
 Electrical controller. E A Sperry.
 Elevator safety device. H. H. Day.
 Enamelled ironware, making. A J Vollrath.
 Enameling ironware. A J Vollrath.
 Envelopes, machine for fixing threads in. M Grube.
 Exercising apparatus. G A Bowen.
 Fan guard. A W Meston.
 Fastener for glass or other vessels. C Fischer.
 Fence. T S Williams.
 Fence, wire. I C Allen.
 Fertilizers, making phosphatic. J Gregory.
 Filter, germ proof. A L Wilkinson, Sr.
 Fire alarm telegraph system, auxiliary. J Sachs.
 Firearm, automatic. W L King.
 Fire extinguisher chemical. M L Bosworth.
 Fire plug or hydrant. H Thomson.
 Flooding clamp. W P Davis.
 Floors or ceilings, construction of. J F Kleine.
 Flue, smoke pipe. T D Garner, Jr.
 Flushing tank. J R Donnelly and C F Barton.
 Folding table. G A Bowen.
 Foot, artificial. J H Kane.
 Foot rest. J A Byliss.
 Form, draping. J M Walters.
 Fruit drier. J J Kurtz.
 Fruit picker. L Abbott.
 Furnace. R Hartje.
 Furnace. F H Richards.
 Furnace for steel melting or analogous purposes, high temperature. B H Thwaite.
 Furnaces, apparatus for controlling the admission of air to. G L Thiel.
 Galvanizing furnace, pot or tank. G Lieban.
 Game counter. W Sowdon.
 Game table. W E Andrew.
 Gas, apparatus for the manufacture of. J W Hayes.
 Gas burner. H A Fry.
 Gas engine. E Narjot.
 Gas lighter, electric. J O Dahlgren.
 Gas producer. L Bemelmans.
 Gases under pressure for obtaining motive power, means for generating. A Nobel.
 Gate. W C Hooker.
 Generator. W J Ranton.
 Glass, decorating. A Steffin.
 Glassware, article of. A Steffin.
 Grain separator machine. W H Webb.
 Grain washer, barley or other. J A Saladin.
 Grate, traveling. E B Cox.
 Grinding machine work holder. W Linden.
 Gun, magazine bolt. U Marga.
 Harvester. G H Miller.
 Harvester, corn or cane. R B Robbins.
 Harvester sheaf carrier. J F Seiberling.
 Heating and smoke consuming apparatus. G W Poole.
 Heating or ventilating device. H P Huse.
 Heel burnishing machine, wax. J O Collins.
 Heel rinding and trimming machine. J F Isaacson.
 Hinge, spring. A S Held.
 Hinge, spring. W P Keenan.
 Hitching device. C W Collins.
 Hoist, differential. W T Sears.
 Horse-detacher and brake, combined. A H Chilton.
 Horseshoe calk. J F G de Roussy de Sales.
 Hydrocarbon burner. J Williams and G A Cummer.
 Incubator. J R Roberts.
 Injector. L E Hogue.
 Insect screen and trap. R J and R S A Tarbell.
 Insulated pipe coupling. G Peeples.
 Insulating thimble. I A Brown.
 Insulators supporting same. Fixing electric conducting wires to. R Schomburg.
 Intrenching tool. G E Albee.
 Jacquard hooks, machine for bending. R C Manville.
 Label for file binders. A R Baker.
 Lace fastener, shoe. J Homer.
 Ladder extension attachment. W Gates.
 Lamp, electric arc. G Kirkegaard.
 Lamp, electrical glow. H Cottrell.
 Lampshade. W E Ward.
 Lamp socket. L Stirn.
 Lamp socket, incandescent. R C Nonrse.
 Lamp socket, incandescent. L Stirn.
 Lathe dog. G H Willis.
 Lathe, turret. F H Richards.
 Laundry frame. J Wisner.
 Lawn sprinkler. S H Stott.
 Lead, peroxidizing. W W Griscom.
 Leather shaping machine. S Ross.
 Lift, hoist, &c. P G Backman.
 Line reel, fastener, and tightener, combined. C Wagoner.
 Linotype machine. H A Stall.
 Lock. E A Judd.
 Lock. J F Williams.
 Loom let off mechanism. H Wright.
 Loom picker staff. J Languirand.
 Loom picking mechanism. O Piper.
 Loom temple. R Rigby.
 Loom warp stop motion. O Smith.
 Loom weft stop motion. O Piper and J E Newton.
 Lubricator. G A Hofmeyer.
 Lubricator. J E Lagerman.
 Lubricator. L Mertens.
 Luggage carrier. J H Steen.
 Machinery, rope or cable system for operating. J H Watts.
 Malt liquors, apparatus for making. A W Billings.
 Marine signal. G W Stewart.
 Measure, tailor's. J A Alm.
 Measurements, adjustable draft for roof and brace. B F Morgan.
 Medical compound. J V Wilson and C R Wores.
 Metal rods, device for reducing the ends of. O O Elsasser.
 Metals, apparatus for electrically heating or working. C L Coffin.
 Monkey wrench. H Bivin.
 Mop head and wringer. W O Harland.
 Mortar mixing machine. J L Bowles.
 Motor. J J Guldhaug.
 Mower, lawn. F M Waters.
 Mowing machine cutting apparatus. H Moon.
 Music leaf turner. J C Stinson.
 Music stand and case, combined. J H Brookmire, Jr.
 Musical instrument. H G Carswell.
 Musical instrument. I S Goldman.
 Nailing machine, box. B S Atwood.
 Needle blank swaging machine. W H Dayton.
 Numbering machine. F Sanders.
 Nut lock. J E Simms.
 Oar. J N Podge.
 Oil burner. T McDonald.
 Oil can. C H Phelps.
 Ordnance, breech loading. G Gerdon.
 Ore concentrator. T J Lovett.
 Partition, fireproof. F H Mela.
 Peeling machine, vegetable. C Bentel.
 Pencil cases, machine for making. E Weisenborn.
 Perforating tool. H Warth.
 Permananate block and making same, porous. J H Parkinson.
 Piano attachment. L M French and C Nalence.
 Piano strings, machine for covering. F E Lyon.
 Pigment, making sublimed lead. E O Bartlett and C V Petrus.
 Pipe joint. W Sykes.
 Pitcher, ice. F E Wallace.
 Plane, stop and chamfer. A A Curry.
 Planter. J E Betts.
 Planter, corn. G D Frederick.
 Planter, hand seed. J M Basket.
 Plow. H Wiard.
 Pole coupling, vehicle. A Stair.
 Portfolio. W Jeschke.
 Post hole digger. W Daugherty and J S Hill.
 Pressure gage. H Rauser, C Wieber, and A Sokoloff.
 Primary battery. C J Hubbell.
 Propeller, screw. M O Miltzaff.
 Propelling apparatus, boat or vessel. H Barcroft.
 Propelling boats, means for. H W Hoeff.
 Pulverizing and amalgamating apparatus. A Tornaghi.
 Pulverizing mill. S K and E C Griffin.
 Pump, deep well. C A Kelley.
 Pumping engine governor. T Shaw.
 Railway bond, electric. J Meyer.
 Railway chair. C H Read.
 Railway, conduit electric. J A Cassidy and W A Butler.
 Railway crossing electric alarm system. A J Wilson.
 Railway, electric. B F Comstock.
 Railway signal, electrical. H V Riley and C Seldon.
 Railway signal system, automatic electric. C P Breese.
 Railway signaling apparatus. S H Harrington.
 Railway switch. W Halliday and T F Rawls.
 Railway switch. C B Price.
 Railway switch, automatic. W J Coughlin.
 Railway tie. A C Petzman.
 Railway tie. S A Roake and F G Smith.
 Railway track. M G Hubbard.
 Railway, wire. C G Hutchinson.
 Range, cooking. H J Wattles.
 Ratchet drill. W R Bonham.
 Refrigeration, apparatus for dynamic. E Hill.
 Refrigerator. G A Bowen.
 Rein holder. T J Weir.
 Rolling machine, sheet metal. W R Kinneer.
 Rotary engine. C P Moore and F B McGrew.
 Rotary engine. J C Walker.
 Rule gage. J J McManus.
 Ruler. F Frank.
 Safe door lock rack. H M Schmidt.
 Sales recorder and check printer, manual. J P Cleal.
 Sawing machine. M Garland and C M Prescott.
 Sawmill carriage feed mechanism. G M Hinkley.
 Scraping machine, road. J H Hawkins.
 Screw driver. E A Eggert.
 Secondary battery. L B Rowley.
 Sectional boiler. F Grote.
 Seed rack. A Forbes and A G O'Neil.
 Separator governor attachment. J Overholser.
 Sewing machine. L L Miller.
 Sewing machine. J R Scott.
 Sewing machine, boot or shoe. M C and T J Deme.
 Sewing machine, pop stitch. L L Miller.
 Sewing machines, method of and apparatus for winding cops to be used in. W Duchemin.
 Shirt bosom protector. E H Carleton, Jr.
 Shoe. S Lissauer.
 Sifting machine, ash. C E French.
 Signal compensator. J G Schreuder.
 Signaling apparatus. J W English.
 Signaling apparatus. O D and M A Kleinsteuber.
 Siphon. S W Lewis.
 Skate, roller. S W Finch.
 Smelting and separating furnace. L R Bonehill.
 Smoke and gas consuming furnace. G E McCaskey.
 Smoke catcher and separator. F L McGahan.
 Smoke consuming furnace. R Walsh.
 Spark arrester. T Lee.
 Speed gearing, variable. N J Pritchard.
 Spindle. W F Draper.
 Spindle and bearing. W F Draper.
 Spindle and bearing. J H Northrop.
 Spinning rings from sheet metal, die for shaping. M D Marcy.
 Sprayer, insect powder and sand. C G Davis.
 Spring motor. J J and C A McCarthy.
 Stamp, steam. C W Tremain.
 Stamping machine. S B Whitehead.
 Staves, &c., machine for cutting barrels. B J Whitney.
 Stay fastening, dress. F A Gibbs.
 Steam boiler. J Buchanan.
 Steam engine. L C Royer.
 Stiffeners for ladies' dresses, machine for corrugating. G Rosenwald.
 Stove or range. W L Butts.
 Street sweeper. C Z O'Neil.
 Stud, collar or scarf. W H Peer.
 Stump puller. H L Bennett and R B Adams.
 Suit, combination. M Loewenthal.
 Surgical tourniquet. G L B Rounseville.
 Swaging machine, rotary. J C Tatt.
 Syringe, hypodermic. J W Daily.
 Tablet, editor's or reporter's ready copy paper. W S McKean.
 Telegraphic instructor. T J Houck and H M Browning.
 Telephone exchange switch and circuit. J J O'Connell.
 Thill couplings, antirattler for. F P Johnson.
 Thrashing machine band cutter and feeder. J Nerison.
 Tins, &c., holder for. H R Saunders.
 Tire, wheel. J Lones, C Vernon, and E Holden.
 Tires, inflating pump for inflating pneumatic. L Holt.
 Tongue support. J W Brenner.
 Tongue support. J W Lindquist.
 Tongue, vehicle. A B McKay.
 Tooth, universal. H Mork.
 Tooth, artificial. H B Harrell.
 Toy or trick device. A D Mountain.
 Toy, smoke ring. J T Comms.
 Tramway switch. S L Cole.
 Transom lifter brackets, manufacture of. C Glover.
 Trunk lock. E A Judd.
 Tug, lame. F W Miller.
 Type writing machine. A Larsen.
 Umbrella drip attachment. D W Whitaker.
 Valve. C Birkery.
 Valve. H H Burritt.
 Valve, balanced check. T M Eynon.
 Valve body. F H Richards.
 Valve mechanism for compound engines, combined starting and drip. S M Vauclain and K Rushton.
 Vapor burner. J A Chandler.
 Vaporizing apparatus for the complexion, toilet. B R Owens.
 Vehicle wheel. G S Crosby.
 Vehicle wheel. R O Wood.
 Vehicle wheel. M C Yarwood.
 Vehicle wrench. G B Martin.
 Velocipede. E Herrington and R I Butler.
 Velocipede, ice. F E Nadon.
 Vener drying apparatus. A S Nichols.
 Ventilator. E Voss.
 Vessels, device for removing ashes from marine steam. M O Miltzaff.
 Vise. J W Flowers.
 Wagon, dumping. A J Thompson.
 Wash tubs, connection for cement. G Deuerlein.
 Washing machine. J Neukirchen.
 Water heater, stovepipe. E R Austin.
 Water meter, proportional. J Thomson.
 Water meter, rotary. T Zanger.
 Wheel rail guard, vehicle. C J Wagener.
 Windmill. C B Putnam.
 Windmill rudder hinge. F Waidner.
 Windows, mounting, operating, and locking swinging. E E De Kab.
 Wire coupling. D A Byers.
 Wood box, kindling and ash receptacle, combined. J H McIntosh, Sr.
 PATENTS GRANTED MAR. 6, '94.
 Alumina, making. K J Bayer.
 Amalgamating silver ores. A Janin.
 Ammonia, manufacturing. H A Frasch.
 Ammonia still. A Ellis.
 Annealing apparatus. C W Bildt.
 Armature for dynamo electric machine. M Waddell and J B Entz.
 Bait and fishing tackle box, combined. E T Breithaupt.
 Baling press. H Clark and P D Myers.
 Baling press. M C Nixon.
 Band machine. J Welker.
 Bandage, ear. A Thamm.
 Banjo tail piece. E D Son.
 Basin clamp. H Mueller.
 Battery use, automatic switche for storage. T A Willard.
 Beams, machine for cutting sections of metallic. M H Cameron and W Snape.
 Bean separator. E Knapp.
 Bed bottom, wire. O H Elliott.
 Bed, spring. D G Rollins.
 Bell, alarm. C S Bradley.
 Bell ringing mechanism. W H Durfee.
 Bicycle. G W Freeman.
 Bicycle. F E Roberts.
 Bicycle attachment. W J Acheson.
 Bicycle attachment. B A Smith.
 Bicycle driving gear. V Cruger.
 Biscuit making machine. W Christie.
 Blowpipes, device for moving mail from. M J Owens.
 Board and cutter, combined. A H Seaver.
 Boiler water alarm. C A Hatch.
 Book. A C Nison.
 Boot or shoe stretcher. R T Bear.
 Bottle. R B Yerly.
 Bottle lock stopper. J A Shepard.
 Bottle stopper, valve. N F T Hunt.
 Box closure. R W Johnson.
 Brake. W Schmid.
 Bread tray and rolling board, combined. T Collins.
 Brick from city refuse, manufacture of. E L Ransome.
 Brick machine. N B Rice.
 Brick or tile cutting table. J D Fate.
 Bridge gate. G Laut.
 Bridge gate. G F Ryan.
 Brush cutting machine. M P Kelly and C Holloway.
 Bucket, oyster. W E Crume.
 Buckle, trace. G V Martin.
 Building construction. E L Ransome.
 Burglar alarm. A N Woodard.
 Can body making machine. C M Symonds.
 Can opener. C H Winchester.
 Capstan. W H Harfield.
 Car chair. E Pynchon.
 Car coupling. A L Croft.
 Car coupling. S Crowell.
 Car coupling. H Deitz.
 Car coupling. J A Gendron.
 Car coupling. B Halstead.
 Car coupling. R Haub.
 Car coupling. I N Hinshaw.
 Car coupling. C W Hinton.
 Car coupling. T J W Howard.
 Car coupling. D W Lawhon.
 Car coupling. E W Schmitz and J Wallmann.
 Car coupling. P Sweeney.
 Car doors, means for operating dumping. N Barney.
 Car, express. F D Gilderleeve.
 Car fender, street. R C Lothrop.
 Car replacer. C W Archer.
 Car seat, railway. J Krebbiel.
 Car seat, reversible. J Lemman.
 Car unloading device. G H Hulett.
 Car ventilator. T L Merrill.
 Cards, pack of playing. A I Paine.
 Carpet stretcher. J Cooper.
 Carrying apparatus. J G Delaney.
 Cash recorder. C W Wilson.
 Cash register. J Hare and G F Cook.
 Casket clamp for harness. G F Baird.
 Casting frames for fence ratchets, pattern for. J Stauffer.
 Cement compound. C J Everett.
 Chains, machine for making sheet metal. R W Jorres.
 Chair seat. A Evans.
 Check hook eye. C H Shultz.
 Chimney. C E S Dunlevy.
 Cigar. E Hotz.
 Cigar holder. R D Gates.
 Clipper, hair. J K Priest.
 Clock pendulum. O Bartel.
 Clothes line attachment. E J Van Wormer.
 Clothes wringer gear casing. W I Gong.
 Coach steps, making. B D Druen.
 Communion service. J G Thomas.
 Compound engine. E Schwoerer.
 Concrete construction. E L Ransome.
 Condenser, exhaust steam. J A Dillon.
 Cooker, steam. J A Kendall.
 Corpses, apparatus for the preservation of. V E Cohen.
 Corset. B Epperly.
 Crank. C Tyler.
 Cultivator. H D Sabin.
 Curling iron heater. S O Fowler and W R Taylor.
 Current motor, alternate. W Stanley, Jr.
 Current motor, alternate. J F Kelly and C C Chesuey.
 Current motor, alternating. C E L Brown.
 Current motor, alternating. J F Kelly.
 Currycomb. E C Ives.
 Curtain holding device. E E Piper and G H Davis.
 Cycle saddle seat. C L Pepper.
 Dental engine. A W Browne.
 Desk attachment, school. C M Amerman.
 Dish cleaner. W I McCausland.
 Distilling and refining volatile substances and essential oils, process of and apparatus for. A M Todd.
 Door check. R Orr.
 Door fender, adjustable. I A Ritz.
 Drafting table. J H Fry.
 Dray stake pocket. E J Schurmeler.
 Dredging apparatus. C Gullmann.
 Dredging machine. J H Titcomb.
 Drill holding machine, automatic. J B Pen-degrass and K F Rice.
 Drilling machine. W F Barnes.
 Drilling machine. C H Baush.
 Drying apparatus. L M Larsson and C J Bergstrom.
 Duplicating apparatus frame. E S Walker.
 Dust collector. M Harmon.
 Dust collector. G S Wilson.
 Dye, polyazo. J J Brack.
 Dye, red azo. A G Green.
 Electric cable. T J Dewees.
 Electric cable joint. T C Lee.
 Electric circuit breaker. D S Schreman.
 Electric current regulator. E E Ries.
 Electric currents, portable regulator for. E E Ries.
 Electric lighting system. H J Wells.
 Electric machine, dynamo. J E Maynardier.
 Electric motor. G S Dunn.
 Electric wire splice covering. T J Dewees.
 Electrical apparatus, regulating socket for. E E Ries.
 Electrical heater. A Cochrane.
 Elevator. R J Melius.
 Elevator controlling device. W F Cole.
 Embroidering machine. J Fischel.
 Enamelled ironware and process of enameling. A J Vollrath.
 Envelope. G C Billups.
 Escapement wheel, duplex. H J Eisen.
 Escapement wheels, making duplex. H J Eisen.
 Fan, suspension fly. J E Saxe.
 Fare box money changer. C W Muth and H Martin.
 Fare register. C Crook.
 Fare register. E T Taylor.
 Fanct. W Wrigley.
 Fence wire stretcher. L Wyssinger and M H Baer.
 Fence wire tightener. I K Hollinger.
 File and scissors, combined nail. W W Hayden.
 Filler. H Schneider.
 Filter. H R Knersten.
 Filter. W Weir.
 Filter, feed water. A Harris.
 Filtering apparatus. W Balz.
 Fire escape. S H Roper.
 Fire extinguisher. O A Stempel.
 Fire extinguisher, automatic. G T McLaughlin and J Naylor, Jr.
 Fire generator. A Misto.
 Fireplace furnace or heater, open. G R Scates.
 Fish spear. J D Dreese.
 Flies on animals, trap for. R H Guthrie.
 Floor washing machine. J C Garrott.
 Flour bolt. S D Barr.
 Flushing apparatus. W A Eberhart.
 Fly wheel band brake. L Luckhardt.
 Folding box. S F Sherman.
 Folding table. R Ettinger.
 Food compound. J J Angus.
 Form, adjustable draping. A B Buehl.
 Fountain. E D Brainard.
 Fruit cutter and press. F D Ridge.
 Fruit picker. G W Armstrong.
 Fuel feeding measuring and regulating device, automatic. W H Cooke.
 Furnace. R H Laird.
 Furnace for roasting and distilling refractory ores. A Spier.
 Furniture, combination. C B Geer.
 Gaining machine. R J Laidlaw.
 Games, score card for foot-ball. A A Irwin.
 Gas burner. R Penberton.
 Gas burner, automatic. G I Ewers.
 Gas burner heating attachment. E Copland.
 Gas burner lighting device. G I Ewers.
 Gas engine. J W Hartley and J Kerr.
 Gear cutter, multiplex. U and H E Eberhardt.
 Glove fastener. G E Dantorth.
 Governor, engine. H Aspinall.
 Governor, steam engine. S P Lathrop.
 Grain heading machine. F W Nessly.
 Grain meter, oscillating. D Wilde.
 Grate bar. F J St. John.
 Grinding and polishing machine. C F Roper.
 Hair curler. E Deuchen.
 Hair pin. T Caldwell.
 Hame book. W J Dankworth.
 Hammer, drop. E W Merrill.
 Harmonica, mouth. G Kaiser.
 Harvesting or planting pouch. J T King and S H Truitt.
 Hat, ventilated. C H Davies.
 Hatchway, self closing. W R Wemple.
 Hay curling machine. K Wessel.
 Hay loader. N O Henderson.
 Heating apparatus, electric. A E Appleyard.
 Heating apparatus, hot air. S H La Rue.
 Heating apparatus, hot water. J C Norton.
 Heel nail. G A Curtis.
 Hitching post. L W Cline.
 Hollow articles, apparatus for manufacturing. M A Jonet-Pastre.
 Horseshoe. Z Birdsall.
 Hose coupling. R F O'Meara.
 Hose fastener. A L Baily.
 Hot air and hot water heater, combined. A C Mott.
 Hot water furnace. A C Mott.
 Hub attaching device. S Robinson.
 Hydraulic motor. E C Nichols.
 Hydrocarbon burner. W H Ames.
 Hydrocarbon burner. P J Mullaney.
 Ice breaker for tugs, &c. L C Bovy.
 Ice cream freezer. J W Woodward.
 Ice rink. E de Stoppani.
 Implement, compound pocket. J C Schlarbaum.
 Incandescent elements, composition for. T C Crawford and L K Bohm.
 Incandescent elements, making. T C Crawford and L K Bohm.
 Index purposes, slip cutter for. A J Rudolph.
 Insulator, strain. H H Luscomb.
 Ironing table. J M Moore.
 Jar holder. J A Parry.
 Joints, means and method of maintaining tight. E Stowell.
 Keyhole guide. J L Easley.
 Knives or kindred articles of cutlery, making. E C Lombard.
 Knitting machine, straight. J A Wilson and R Hutchinson.
 Knitting machines, electric stop motion for. A A Merritt.
 Lacing fastener, shoe. S J Simmons.
 Ladder, extension. J B Moore.
 Lamp, electric arc. J J Wood.
 Lamps, automatic cut out for incandescent. E H Johnson.
 Latch. H Arnet.
 Lead press. H B Cobb.
 Leaf turner. A W Gitchell.
 Level and key seat rule. F Schaefer.
 Levels, adjustable index for spirit. H Wheeler.
 Liquors, apparatus for cooling and aerating. P Hildenbrand.
 Logs, rossing. E C Hargrave.
 Loom harness motion. J Magee.
 Loom shedding mechanism. G W Stafford.
 Loom shuttle. O Piper.
 Looms electrically, apparatus for forming sheds in. J Kaufmann.
 Lubricator. J F Evans.
 Lubricator. M F Nester.
 Malt kiln and method of drying malt. W H Prinz.
 Malting grain, method of and apparatus for. W H Prinz.
 Mangle. J G Crawford.
 Match stick bending machine. E H Eisenbart.
 Metal working, electric. H Lemp and W S Moody.
 Mine door. G D Warren.
 Mirror. G L Hills.
 Mortising machine. D Hepp.
 Mower, rotary lawn. A B Schermethorn.
 Mowing machine attachment. W Storey.
 Nut lock. B F Sweet.
 Nut polishing or edging machine. G Dnnham.
 Offer for shafting, mechanical. G H Cole.
 Ore concentrator. C G Pingel.
 Organ, pipe. E Howard.
 Package for goods. J W Kirkpatrick.
 Paddle wheel, boat. N Pelletier.
 Pamphlet stapling machine. D A Flavell.
 Paper holder, roll. S Wheeler.
 Paper mill stuff chest. E L Savage.
 Paper mill making machine. E Hubbard.
 Pavement, artificial stone. P M Brunner.
 Penholder finger rest. M Goetze.
 Phonograph mandrel. A D Andrews.
 Photograph apparatus, coin controlling. J W Barton.
 Piano or organ case, upright. W T Smith.
 Pipe drilling and tapping tool. M F Smith.
 Pipe hanger, steam. S O'Brien.
 Pipe nipples, device for holding. T Gilbey.
 Planter furrow closing attachment, corn. A W Trotter.

- Plate lifter. A W and D L Burnham.
 Plow. M P M Davis.
 Plow. R Finot.
 Pocket knife 2. B von Baltzingslowen.
 Polishing machines, article holding table for. F H Barnard.
 Portable heater. J Graves.
 Pouncing pad, flexible. G E Brush.
 Power, electrical transmission of. C F Scott.
 Pressing food by cold, &c. F M Peck.
 Press for veneers, &c. J J Hayes.
 Printer's chase. J W Osborne.
 Printing machine, multicolor. J L Davies.
 Printing presses, adjustable roll for. P Split-hoff.
 Pulley, differential. L Kleriti.
 Pump. J S Losch.
 Pump, air compressor beer. J Braun.
 Punching and pinking machine. E B Stimpson.
 Purse or bag frame. J E Mergott and C Hering.
 Puzzle. H Walton.
 Radiator, electric. S B Jenkins.
 Railway rail joint. R B Muehlfeith and C J Ibel.
 Railway signal. E W Harden.
 Railway signal 2. R S Wiles.
 Railway switch. E W Harden.
 Railway switch, shifting. H E Lowe.
 Railway tie. J Dyson.
 Range boiler. G Booth.
 Ribbon holder. A E Hartzell.
 Roads, machine for making or repairing. M G Binnell.
 Rolling mill, continuous. W H Maddock.
 Roofs or masonry, composition of matter for coating. J Daymon.
 R dary engine. R Z Pooler.
 Rubber mold or pattern and manufacturing same. M Smith.
 Rubber molds and patterns, apparatus for the manufacture of. M Smith.
 Rule, calculating. E F Steck.
 Sash cord guide. C Wolcott.
 Sash holder. J F Bjurlund.
 Scaffold. E Bonlander.
 Scale, hydrostatic. J H Digeon.
 S raper, road. W H Diedrick.
 Scraper, wheeled. J R Williams.
 Scrapers, lock and dumping mechanism for wheeled. A F Bernard.
 Screen frame for windows, &c. A Brauu.
 Screw. R Stilwell.
 Seal. W L Carr.
 Sealing device, bottle. G A Boyden.
 Seeding machine. A Lindgren.
 Sewing machine. A E Lindner.
 Shade roller. D Lauer.
 Sharpening razors, shears, &c., machine for. C A Worden.
 Shutter board. R Zoll.
 Sign, fence. J W Wilson.
 Sign, street car. E J Rauch and W A Keith.
 Signal box, electric. T F Gaynor.
 Signaling and communication, system for. T F Gaynor.
 Sleigh, bob. J H Jackson.
 Smoke stack hood. C R Peirce and F B English.
 Soda crystals, making. H R Browne.
 Spinning spindle supporting device. R Atherton.
 Stamp mill mortar. H Bolthoff.
 Stay, dress. F W Lyon.
 Stay, dress. E B Taylor.
 Steam boiler or generator. C D Mosher.
 Steam by electricity, apparatus for generating. H E Rider and J H Lewis.
 Steam engine. E Shydecker.
 Steam generating apparatus. H McPhail.
 Steam generator and heating apparatus. I Fisher and J W Partridge.
 Steam, tube for superheating. E Schwoerer.
 Steaming and cleaning grain, apparatus for. J E Riley.
 Steering apparatus, steam. C H Hawkins.
 Stilt step. L C Packham and C L Cline.
 Stock loader. C Rotzien and P Arnold.
 Stone polishing machine. A F Spaulding.
 Stove, soldering. E T Burgess.
 Street or station indicator. B Barnett.
 Structural metal work. A Krause.
 Submarine drilling apparatus. T Symonds.
 Sulfate lyes, process of and apparatus for purifying. C von Grabowski.
 Swift, yarn. L M Heruz.
 Swinging gate. W Hemme.
 Switch. A P Odell.
 Switch signal, electric. T L and N W Dalton.
 Switching from main to side tracks, means for. J B Duguid.
 Table. J Heissenberger.
 Table knife. R Krohn.
 Tack driving implement. M Brock.
 Telegraph repeater. W E Sloan.
 Telephone directory holder. C C McCloskey, Jr.
 Telephone exchange system. E Pope.
 Telephone receiver. C Selden.
 Telephone system. E Pope.
 Tent pole. A S Comstock.
 Thermostat. E Barney.
 Thread holder and cutter. D R Porter.
 Time recorder, employees. N M Watson.
 Tire, pneumatic. J J Fox.
 Toilet sets, supporting frame for. N O Bond.
 Tool, combination. H W Smith.
 Tool or implement holder. L M Burbank.
 Tooth, artificial. C F Rutterford.
 Torpedo wrapper. J Cook.
 Toy motor, automatic. H Hensel.
 Traction wheel, bicycle or other. C A Ives.
 Transit instruments over physical points, device for centering. C H Brightly, H M Fuller, and E A Singer, Jr.
 Trap. L A Turner and H C Fletcher.
 Traveling bag, extension. E W Thompson.
 Treadle spring. G Frank, Jr.
 Trolley wire hanger. G Forbus.
 Trowel. R Walrath.
 Truss. G W B-H.
 Upholstery spring support. J A Staples.
 Valve for gas saving regulators. J C Richardson.
 Valves, &c., automatic regulator. E H C Oehlmann.
 Vapor burner. J S Wood.
 Vehicle wheel. A M Allen.
 Vehicle wheel. W Bonnar.
 Vehicle wheel. W H Dettler.
 Vending machine. E T Brown and W W Olcott.
 Ventilating fire rooms, apparatus for. A E Aubry and G H Dawson.
 Vessels over bars, device for floating. J Hadley and F Foster.
 Veterinary tooth cutter. H C Stanbridge.
 Violin mute. H W Hoeft.
 Violoncello rod. W H Howe.
 Wagon brake. W Manwaring.
 Wagon, dumping. N Barney.
 Wagon, dumping. J Baners.
 Wagon, garbage. M S Hubbell and T H Gilbert.
 Wagon jack. L L Kellogg.
 Washing machine. R R Stevenson.
 Water closet. S W Lewis.
 Water closet 6. H C Stifel.
 Water closet bowl. H C Stifel.
 Water closet coupling. J J Nickels.
 Water closet tank. P Harvey.
 Water purifying apparatus. T Craney.
 Wave motor. J C Walker.
 Weed cutter. J F Dole.
 Weighing and registering machine. W B Dickson.
 Windmill. T Forstner.
 Wire reeling truck. J Nagel.
 Wire spool or reel. C Beck.
 Yarn or thread into carriers, mechanism for drawing. H Wyman and J A Clark.
 Yoke center, neck. E M Van Valkenburg.
 Zinc ores, treatment of. W R Ingalls and F Wyatt.
- ### PATENTS GRANTED MAR. 13, '94.
- Adjustable chair. C H Knight.
 Aerial locomotive. C G Cross.
 Air brake coupling, automatic. W A and B S H Harris.
 Amalgamator 2. E S Bennett.
 Armature for dynamo electric machines or motors. W B Sayers.
 Bale or bundle tie. J W Carver.
 Basket making machine. L Palmer.
 Bath-tubs, tables, &c., support or standard for frames of. S S Burr.
 Battery grids or plates, method of and apparatus for forming secondary. J M Pendleton.
 Battery switch, secondary. H Muller.
 Bed brace. N Clark.
 Bed, folding. C F Mankey.
 Bed, folding. J F Wilmot.
 Bed, time alarm. G Q Seaman.
 Beehive. H H Weyer.
 Beer cooler. W Gibson.
 Bell crank, adjustable double. N W Boyd.
 Berth, collapsible sleeping. A H Baird.
 Bicycle. G G Hasbrouck.
 Bicycle. W A Smith.
 Bicycle gearing. L Watkins.
 Bicycle stand. A D Moulton.
 Bicycle wheel. G Focht, Jr.
 Billiard cue chalk holder. H Campbell.
 Binder, temporary. E L Brundage.
 Block signal, automatic. J D Taylor.
 Blower, fan. W T Christy.
 Blowing engine. C A Klotz.
 Boiler furnace. C L Lorraine.
 Boiler tube cutting device. C O Theime.
 Bolt actuating mechanism, retarding device for. A G Burton.
 Bone cutter. E J Roche.
 Bottle case. J H Nellis.
 Bottle stopper. C Huch.
 Box for pattern or other cards. C F G R Schwerdt.
 Brick kiln. H L Hayes.
 Brick kiln. J M Shuck and T E Martin.
 Brick machine 2. J J Kulage.
 Brick, manufacturing. J J Kulage.
 Brick or tile machine. J J Kulage.
 Brick press. F W Seamans.
 Bridge gate. H F Barndt.
 Brush, folding. W E Frank.
 Brush, shoe. J Knopfel.
 Bucket, milk. M E Thomas and W H Denison.
 Burglar alarm, detouring. W S McClintock.
 Cable conveyers, &c., coupler for. M Garland.
 Cable hanger. A E Johnson.
 Calendar roll. N D Ingram and G H Moore.
 Can filling machine. H C Baxter and H R Stickney.
 Candle holder. R H Hepburn.
 Capacity of hollow vessels, apparatus for ascertaining the. G Vollner.
 Car brake. D Hazard.
 Car brake mechanism. B Wolhaupter.
 Car coupling. V Brett.
 Car coupling. A Gudmunsen.
 Car coupling. G W Jackson, R Smith, and E A Bennett.
 Car coupling. H M Marquell.
 Car coupling. D J Stevenson.
 Car coupling. G F Sudheimer, F Thon and M Richter.
 Car coupling. J A Ward.
 Car fender, safety. G Q Seaman, A Wilson and W Jones.
 Car fender, street. T Davies.
 Car lighting. I N Lewis.
 Car lighting. W M Miner.
 Car lighting, heating, &c., system of. I N Lewis.
 Car safety gate, railway. T J Morgan.
 Car sanding device. J Ballard.
 Cars, air pipe coupling for railway. J Emerson.
 Cars electric motor for street. W Baxter, Jr.
 Cars, system for warming fruits. J F McElrath.
 Carbonating liquids, apparatus for. C F A Couvert.
 Carpet stretcher. J Treseder.
 Carpet stretcher and tacker, combined. L M Kenton.
 Carriage. H P Wells.
 Cattle guard. L Hills.
 Cattle guard, surface. B Wolhaupter.
 Chain for vehicle bodies, tie. T M Nalton.
 Check hook. E A Stephens.
 Check row wire, machine for making. R Faries.
 Chime-ringing mechanism. W C Wilkins.
 Churn. A Hamlin.
 Churn vent 2. S D Palmer.
 Cigarette machine. J Riera y Hernandez.
 Clamp. D W Aylworth and N E Leslie.
 Climbing hills, mechanism for facilitating. A Goebel.
 Clothes drier. J P Hill.
 Clothes pin box. J W Pike.
 Clothes pin, double. J N Edmonds m.
 Clutch. M H Avery.
 Clutch. H W Hill.
 Coal drill. G W Thayer.
 Coating cast iron with other metals or alloys. L R Nourse.
 Cob pipe boring machine. P Lane.
 Coke oven. F Brunck.
 Commutator, electric machine. C Olivetti.
 Compo board. H W Mowry.
 Compound engine. J Hang.
 Condenser, steam engine. S S Leach.
 Cooling apparatus. C Kellgren.
 Copying pad. L Bailey.
 Corn cutter, green. S E Morral.
 Current motor, alternating. R Landell.
 Currycomb, spring. T Butterworth.
 Curtain fixture, window. W H King.
 Curtain holding device. E E Piper.
 Cut off, rain water. C S Low.
 Cycle saddle. G Simmonite and H L Holder-ness.
 Cycle saddle, pneumatic. J Carroll.
 Damper or damper clip. W H Berger.
 Decorator, rice. F Dresser.
 Dental articulator. F E Hansen.
 Dental engine. F H Berry.
 Dental impression cup. H L Knight and H E Duncan.
 Dish cleaner. H F Low and L A Thompson.
 Dish washer. M Stone.
 Display rack. B Chamberlain.
 Door hanger. H L Ferns.
 Door hanger wheel. E Y Moore.
 Door lock, sliding. W T W Carl.
 Dough rolling and cutting machine. W F Curry.
 Drawer. A Beretta.
 Drawer support, extension. J H Adkins.
 Drinking fountain for fowls 2. A L Higgins.
 Drum and cymbal pedal or beater. W J Rap-pold.
 Dust collector and separator. M F Gale.
 Dye, basic yellow. E Schleicher.
 Dye, black. R Kirchhoff.
 Dye, brown azo. C Rudolph.
 Dye from amidophenolsulfo acid, azo. C Rudolph.
 Dye, gray azo. M Hoffmann and C Krohn.
 Dye, red. H A Bernthsen.
 Dye, red rhodamin. H A Bernthsen.
 Dye, rhodamin 2. M Ceresole.
 Dye, yellow tetrazo. J J Kacy.
 Dynamo, self regulating. I N Lewis.
 Easel. H F Beecher.
 Eaves trough iron. O T Roberts.
 Egg beater. W A Van Deusen.
 Egg beater, &c. L Mohr and H Perk.
 Egg tester. E Huett.
 Electric current regulator. C D Haskins.
 Electric heater. J O'Meara.
 Electric lock. J R Donnelly.
 Electric machine, dynamo. F J Croucht.
 Electric motor. O F Conklin.
 Electric switch. I N Lewis.
 Elevator. J W Blake and F H Lacey.
 Engine steam chest. G Cook.
 Engineer's seat. E H McLaughlin.
 Engineer's tape reel. J H Shedd.
 Excavating trenches, machine for. A J Mason.
 Exhibit case. M Sherman and C Goodman.
 Expansion engine, triple. E W Harden.
 Explosive. H M Chapman.
 Fan motor, suspended electric. J F Denison.
 Faucet. A Hurst and J I Boyer.
 Feed trough. W H Wellsted.
 Feed water heater. J Bell.
 Feed water heater. B Hall.
 Feed water heater and regulator. P Browne.
 Fence building and repairing device, wire and picket. M Stephens and S O Koons.
 Fence post. C Sliker.
 File, office. A H Costigan.
 File, paper. A B Dick.
 Filter. H J E Jensen.
 Finger ring. C M Levy.
 Fire escape. E Goldberg.
 Fire escape, spider frame. M P Brown.
 Fire escape rack. E Cardarelli.
 Firearm, recoil operated. F Wackermann.
 Firearm, device for lessening the noise of. J Stahl.
 Floral stand. T A M Brueckner.
 Flour bin and sieve, combined. W H and B D Cook.
 Flue cleaner. O P Clay.
 Fluid pressing engine. G Dixon.
 Flying apparatus. G Wellner.
 Foundry plant. S Merchant.
 Frame for pictures, &c. W K David.
 Fruit carrier. W E Howell and W H Gilbert.
 Fruit clipper and gatherer. C W Crutsinger.
 Fruit picker or pruner. I C Stelson.
 Fruit wrapping machine. T E Nifinger.
 Gas apparatus. S M Mullin and S C Green.
 Gas, apparatus for manufacturing water. J R Peters.
 Gas, apparatus for simultaneously scrubbing, purifying and condensing. C W Blodget.
 Gas burner governor. A Hall.
 Gas, furnace for producing fuel. J Harle-man.
 Gate. C G Deloye.
 Glass, embedding wire netting in. F Overy.
 Glass, machine for embedding wire netting in. F Overy.
 Glass, process of and apparatus for embedding wire netting in. J E Parker.
 Gong, electromechanical. M Martin.
 Grinding wheel water box. F M King.
 Hammer, self feeding magazine. A D Cushing.
 Harness sack. T C Moore.
 Harrow. H H Tigner.
 Harrow, spring tooth. D O Everest and L C Lull.
 Harvester, corn. J A Johnson and N O Starks.
 Harvester, grain evener for self binders. F C Almont.
 Hat and coat hook. C E Vail.
 Hay and stock rack. L Shaaabarger.
 Heat regulating apparatus, automatic. C F Goodhue.
 Heater, cooler and ventilator, combined. E F Ruchr.
 Hinge lock. A J McCauley.
 Hoop. J Shephard.
 Horse checking device. P T Chabert.
 Horseshoe. L La Vock.
 Hub, vehicle. H W Broesquin.
 Hub, wheel. F L Bryant.
 Incubator heat regulating valve. J W Jacoby.
 Inhaler. T G H Nicholson.
 Inhaler. W H Russell and H C Earl.
 Injector. A Simpson and M Speicher.
 Injector. E J Young.
 Ink distributor. J Waterston.
 Ironing table. W H H Marcum.
 Jail construction. D Salfeld and H Kohl-berg.
 Journal box. G W Lacy.
 Key holder. J F Waesch.
 Kilm. A E Hetwiler.
 Kitchen cabinet. F E P Pool.
 Lamp, electric arc. F L McGahan.
 Lamp, gas. E Moreau and H S Miner.
 Lamps, regulating socket for incandescent. M D Greengard.
 Land roller. E Alpaugh.
 Latch. W C Sheldon.
 Lathe carriage. J Young.
 Lathe fixture for gear cutting. R Branstetter.
 Lathing, metallic. M Brendel.
 Lithographic and hectographic stone, artificial. W R Forbush.
 Locomotive. B Heinholtz.
 Locomotive brake. H M Laffon.
 Locomotive cab or other window or door. H W Tinker.
 Locomotive cab window or door. H W Tinker.
 Magnetizing coil. J D Ihlder.
 Mail bag fastener. L Williams.
 Mail delivering apparatus. D Cooke.
 Mangle. M F Danmeyer.
 Mattress, wire. D H Gail.
 Measuring apparatus, deep well. P Scott.
 Measuring, cutting and stitching fabrics, machine for. W H Palmer, Jr.
 Measuring instruments, safety device for electrostatic. W E Ayrton and T Mather.
 Merry go-round. J C Somers.
 Metal drill. V Pinks.
 Metal, finishing. N L Bradley.
 Metal working, electric. H Lemp and W S Moody.
 Milk can. F Wolf.
 Mining shaft cage. N Haller.
 Molding machine attachment. I N Kellogg.
 Molding machine, founder's. E Grant.
 Molding table. C F McGilvray.
 Mop wringer 2. H F Low.
 Motion, mechanism for transmitting. W Scott.
 Motor. G H A Meyer.
 Musical instrument. W E Bent.
 Musical instruments, string winding mechanism for. J Murdock, Jr.
 Mustache shield or guard for cups, detachable. R Macmorris.
 Nut lock. T C Butler.
 Nut lock. A J Mauermann.
 Nut lock. W E Russell and M S Woods.
 Nut lock. A C Vaughan.
 Oil burner. A H Calkins.
 Oil can. A E Johnson.
 Organ. J Bionig.
 Package wrapping machine. L C Crowell.
 Packing. R J McIlhenny.
 Packing, pipe coupling. D R McKim.
 Pail, collapsible. H H Freer.
 Pail, milk. E B Priggs.
 Paper box. F M Turck.
 Paper box and locking device therefor. F M Turck.
 Paper fastener. J H F Dixon.
 Paper feeding machine. W Womersley, G Sague and M A Clapp.
 Paper holder, toilet. A N Spooner and H C Calkins.
 Pattern for drafting garments. D Ryan.
 Pen, electric perforating. A D Lewis.
 Pen, fountain. C E Browning.
 Perforating machine. J K Gore.
 Permutation lock. J Bois.
 Phenol bisanth compound. B R Seifert.
 Photographically recording time, position and speed, apparatus for. W C Petri.
 Piano action. L Schubert.
 Pillow, sham. W T Lormer.
 Pipe coupling apparatus, air or steam. J Emerson.
 Pipe wrench. C Hall.
 Pipe wrench. J Wachtler.
 Pipe wrench. C H Weaver.
 Plane. J A Trant.
 Plant support. N Leonard.
 Planter and cultivator. H Nehrmeier.
 Planter, automatic cotton or corn. H Nehrmeier.
 Planter, automatic check row corn. A Anderson.
 Planter, corn. A Anderson.
 Planter, cotton seed. S P Sawyer.
 Planter, hand corn. G L Hudson.
 Plastering walls, composition for. C M Armstrong.
 Plate lifter, automatic. G W Best.
 Plow, hand. R Conway.
 Plow shovel. L M Meeter, H and W D McClure.
 Plow sulky attachment. H K Hoshouer.
 Pressure regulator. W Werle.
 Printing machine. H A W Wood.
 Printing plates, preparing aluminium. O C Strecker.
 Printing press perforating attachment. C L Smith.
 Program holder, school. E E Douglass.
 Propeller for vessels, reciprocating. W K Hogan.
 Propeller, marine. A H Carpenter.
 Propulsion of vessels, means for the. W H Witte.
 Pulley, expanding. A Given and C B Smith.
 Pulp or paper mills, suction roll for. H Niesan.
 Pump, double acting. H C Stonffer.
 Pump for forcing beer, air. J L Seitz.
 Pump, force. J H Stoll.
 Pump, rotary. C Rumley.
 Racking the beam means for raising and lowering. H J Walters.
 Racking, snap fastener 2. J J O'Brien.
 Railway. C S Lafferty and J H Brown.
 Railway, closed conductors. J L K.
 Railway, electric. M W D.
 Railway signal, detouring. J L O'Brien.
 Railway signal, electrical 2. J L O'Brien.
 Railway supply system, electrical. J L O'Brien.
 Railway switch. F Hardy and L W M Cants.
 Railway, wagon. T M Gad muth.
 Railways, closed conductors for electric. W Lawrence.
 Refrigerator car ice tank. E R Hinchey.
 Refrigerator door fastening. R G Chase.
 Revolvers, cylinder actuating mechanism for. E M Conch.
 Rheostat. H M Nolta.
 Ring expanding tool. H V Benndorf.
 Rucker, child's. J Davis.
 Rocking chair 2. J R McIlvray.
 Rolling mill transfer table. F H Trott.
 Roof framing tool. J Parkhill.
 Rope take up. W Smith.
 Rotary engine. J V Davis.
 Rotary engine. G M Hall.
 Rotary engine. T Martin, F Priestley and L D Pierson.
 Rotary engine. G H Weston.
 Rule, extension cane. T E Tracy.
 Ruling device, parallel. A B Bick.
 Sad iron heater. E L Reid.
 Safes, electrical protection for. C F A Souts.
 Saw, drag. J B Wetmore.
 Saw handle. B S Carr.
 Scaffold, painter's. L Mann and F L Anken.
 Screw swaging machine. J Le Blanc.
 Seal lock. R M Sully.
 Secondary battery. E R Whitney.
 Sectional boiler. J Lapp.
 Semaphore signal. L L Green.
 Separator. R W Jessup.
 Sewing machine. J Douglass.
 Sewing machine ruffing attachment. R W Whitney.
 Shade appliance, window. L M Rice.
 Shade roller. S Hartshorn.
 Shafting, apparatus for turning and polishing. P Medart.
 Shafting protector. J Hunt.
 Shafts, device for repairing broken. D Ker-shaw.
 Shawl strap. C Zender.
 Sheep, apparatus for ear marking. G W Shailer.
 Sheet metal can. T Reis.
 Shelf bracket. T Corsaden.
 Skate wheel. A J Mauermann.
 Snatch block. T B Fernald.
 Snatch block. H V Hartz.
 Soap holder, coin controlled. C S Higgins.
 Soldering machine, can. M Jensen.
 Spool or holdin holder. A B Homer.
 Spring. G Tinton.
 Sprocket wheel. T J Neacy.
 Stake, ground. E E Harvey.
 Stalk cutter. H Nehrmeier.
 Stall, cow. D L Blackburn.
 Stamp affixing machine. E Schafer and H A Levy.
 Stamping machine centering gage. J T Pufl.
 Staves, forming. T J Sullivan.
 Steam boiler. R E Dietz.
 Steam engine. J T Chase.
 Steam trap. J Balmore.
 Sterilizing and disinfecting apparatus. J M Van Heusen.
 Sterilizing by steam. G Popp and J H Becker.
 Stool, adjustable. P A Bredsvold.
 Store service apparatus. H D B Williams.
 Stove. W D Southard.
 Stove lid, &c. L D Gould.
 Stove or range. R M Clark and G E Gilhaus.
 Stove, ornaments. J S Van Buren.
 Sulfur candle. C T Kingzett.
 Sulky, trotting. C Weizand.
 Surgical table. A H Campbell.
 Suspensory pouch. A Baner and T W Heinemann.
 Switch. C E Galbreath.
 Switch stand 2. J B Sufferin.
 Table. P O Claffin.
 Tack driver and carpet stretcher. A J Smith.
 Teething ring. F Bosch.
 Telegraph apparatus. J A Parker and L L Summers.
 Telephone system, interior. T McConbray.
 Telephone toll station instrument. W T Gentry.
 Thrashing machine portable wind brake. C Zimmerman.
 Tile, roof. N Monshansen.
 Timber handling appliance. G H Spencer.
 Tire, cycle or other wheel. A J J Lindner and M Adler.
 Tire, wheel. E Grenet.
 Tobacco jar. M Goldwater.
 Tobacco shelf. J M Hodgins.
 Tool holder. H E Britton.
 Toothpick. C C Southwell.
 Torpedo signal mechanism. T H Wilson.
 Transplanter. J W Morgan.
 Treadle, machinery. J E Kirk.
 Trolley device, electric. C Knapp.
 Tube cutter. J F Beck and J W Konlms.
 Tug, hame. J W Rookwood.
 Twine balling machine. A Blackie and C W Shurtle.
 Type writing machine. L P Diss.
 Type writing machine. L Welspiel.
 Umbrella drip cup. T J Golden.
 Valve, check. W E Hill.
 Valve, check. L Schutte.
 Valve gear. J W Sargent.
 Valve, plug. C B Hodges and J C Wills.
 Valve, straightway. G J Graebert.
 Valves of steam engines, eccentric for operating. J W Sargent.
 Vehicle brace and brake support combined. B F Sweet.
 Vehicle running gear. J F Fry.
 Velocipede. M L Wilcox and J A Simpson.
 Vending apparatus, coin controlled liquid. A L Peirce.

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Vessel, marine. S Lacavalerie.
Vise, drill and anvil, combined. J Weather.
Voting booth. E E Barry.
Wagon bed. H P Gaines.
Wagon, gravel or dirt. A W Coats and J Bartlett.
Washing machine. J S Blood.
Washing machine. T McCrossan.
Washstand and table, combined. A Wettervik.
Wash tub support. C S Bushell and F W Degler.
Watch balance staff and bearing. C A Johnson.
Water closet. F Adee.
Wheel mold. J Slattery.
Whist, apparatus for playing duplicate. C E Parks.
Wind wheel. N X Vroman.
Window or door frames for securing storm sashes or the like, attachment for. J D Johnston.
Wind screen. L W Merriam.
Window screen. L Weglein, Jr.
Windows, electrical protection for. C F A Sturte.
Wood scraper. F J Perkins.
Wrench. C Black.
Wrench. J F Cook.
Wrench. R S Rust.
Wrench, combination. E O Ely.

PATENTS GRANTED MAR. 20, '94.

Account keeping apparatus. S H Baylan.
Acid and metals from nitrates, producing nitric. J D Darling.
Adding machine. W H Clark.
Advertising device. H F Attaway.
Air and ventilating, apparatus for humidifying. W Matthews, J and W Yates.
Air brake. F Lansberg.
Air brake. G W Wilson.
Annunciator. C A McCordy.
Antiradio. H Lahmann.
Armature for dynamo electric machines. L Bell.
Armature for dynamo electric machines. E W Rice, Jr.
Armature for induction motors. L Bell.
Armature, motor. J C Henry.
Armature winding. E Thomson.
Bale tie twister and stretcher. D D Tierney.
Baling press feeder. D J Overholzer.
Band fastening. E C Tecktonins.
Bed brace. W A Watson, Jr.
Bed, folding. E Schroder.
Belt tightener. G H Hanson.
Bicycle foot rest. M W Smith.
Bicycle heel clip. E F Baenziger.
Bicycle mirror attachment. K F Bucherer.
Bicycle propulsion gearing. M L Jacoby.
Bicycle tool bag. J A Hunt.
Bicycle watch carrier. G K Burleigh.
Blind operator, window. R E Hall.
Boiler cleaner. A Schell.
Boiler furnace, steam. J Goodwin.
Boiler furnace, steam 2. J Milton.
Bone cutting machine. C H Farrington.
Book backs, apparatus for marking divisions on. H M Reism.
Bookcase. F H Sheridan.
Bottle stopper. G S Norris.
Box blanks, machine for forming. J T Robinson and H J Chamberlain.
Box partition. J M Leaver.
Brake. H Bussing.
Brake apparatus, vacuum automatic. J Gresham.
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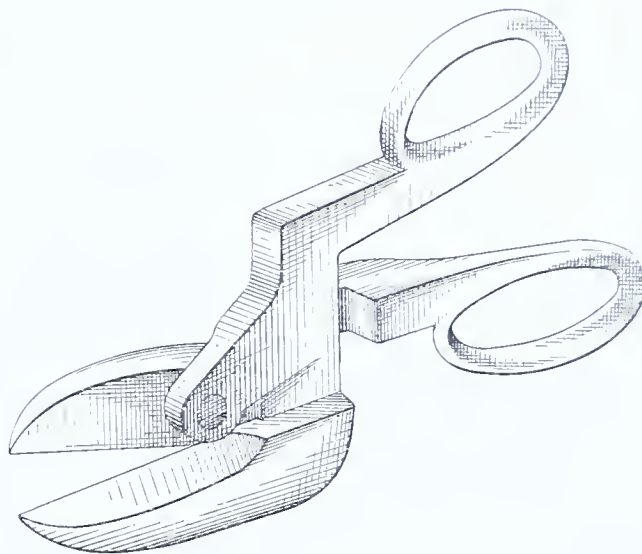
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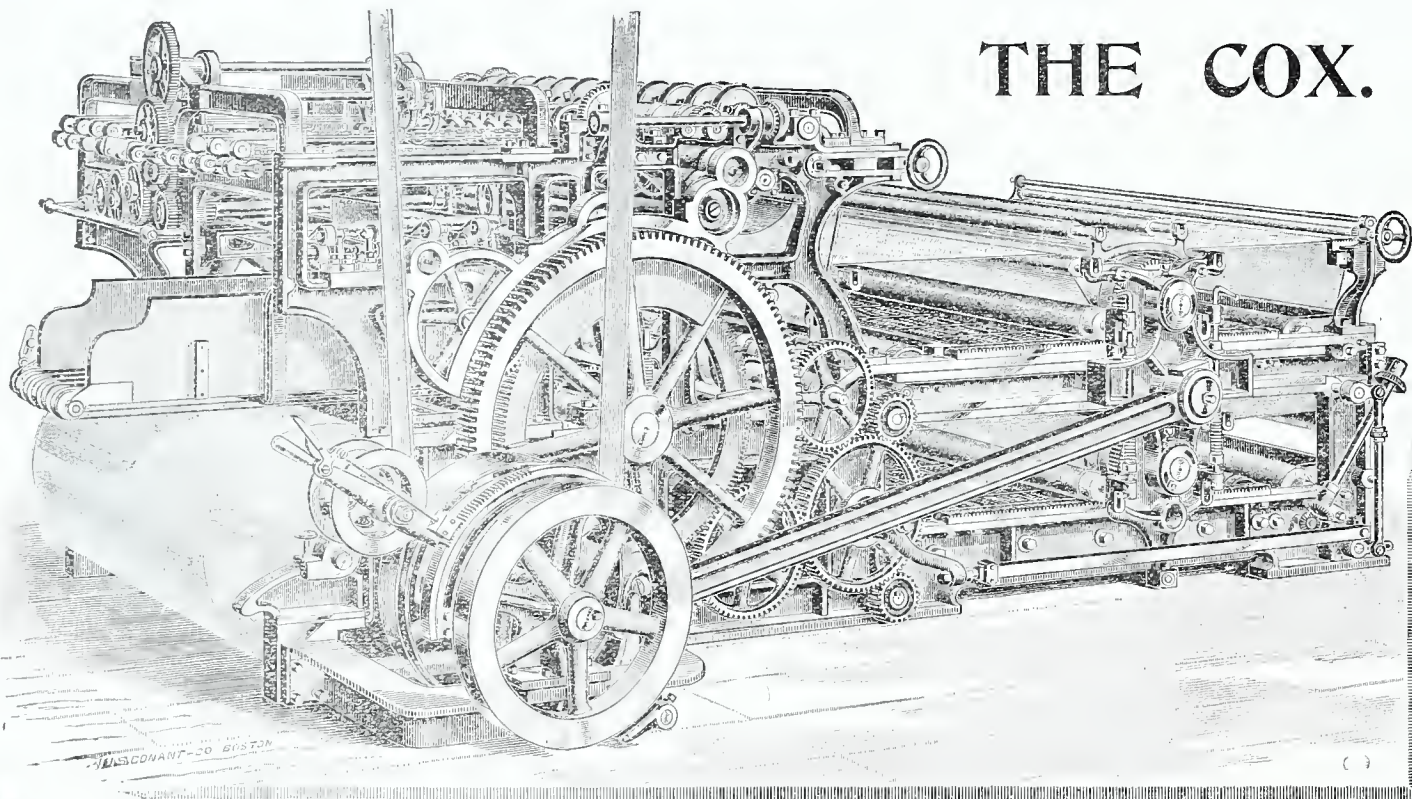
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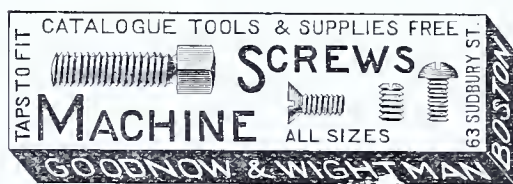
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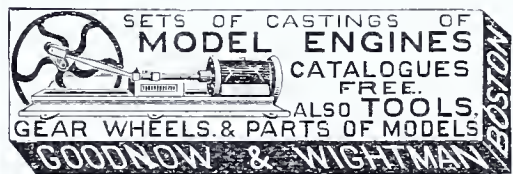
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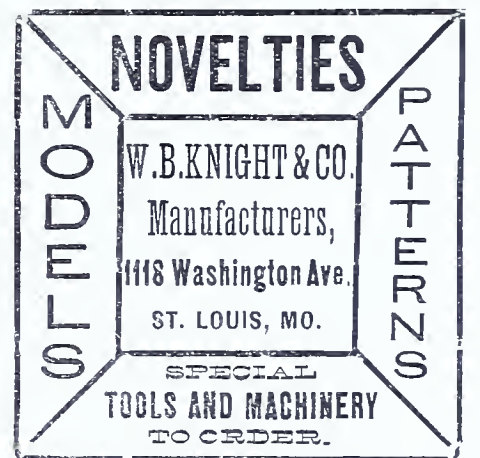
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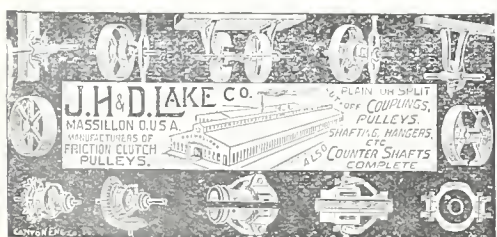
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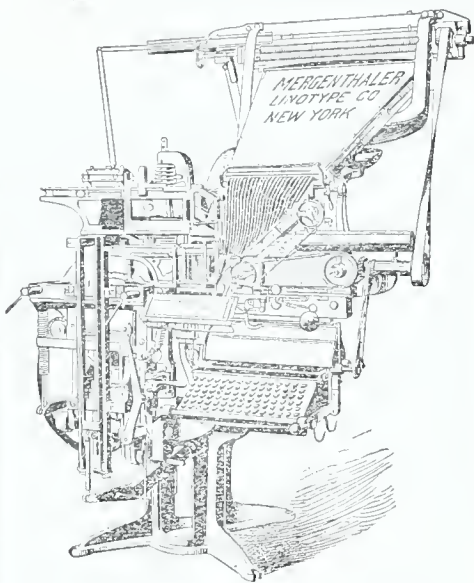
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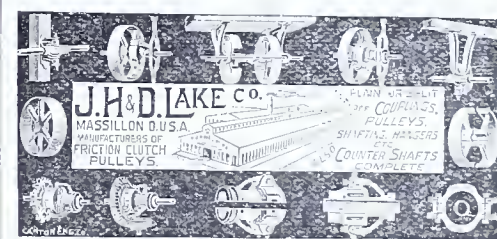
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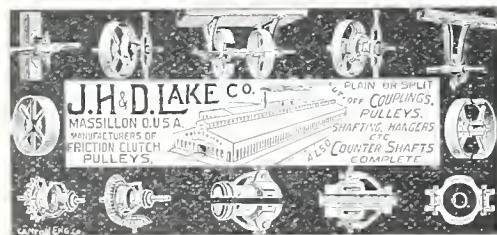
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No. 5.

WASHINGTON, D. C., MAY, 1894.

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GARBAGE CREMATION.

The System Which Promises Complete Destruction in Unlimited Quantities.

The recent experiments made at Chicago to test the system of James C. Anderson for burning garbage, with such marked success, have created a wide interest, not only on account of the great importance of the subject, but because of the high reputation of the inventor in the scientific world; and much curiosity is aroused to learn of the methods employed and how far the obstacles heretofore existing to success may have been overcome.

It is true that pure garbage has been cremated in a limited way by furnaces fitted with grate bars, over which the garbage is spread in thin layers, and by frequent stirring, slowly consumed in fires fed by crude petroleum, but the fresh supply of garbage when first put on, tends to retard the fire, owing to the water in the garbage until its evaporation is complete. In consequence this system is slow, expensive, and inadequate to the conditions existing in large cities. It is the universal experience, regardless of all city ordinances to the contrary, that garbage, house sweepings, coal ashes, tin cans, old shoes, and all the usual debris of the household, are deposited in the box, barrel or other receptacle provided for that purpose, and inextricably mixed together; garbage proper being about 20 per cent of the entire mass, and if cremated at all, it must be in this condition. Here the practical difficulties to be overcome begin. The mass contains a large percentage of water which must be evaporated before cremation is practical; and a more serious obstacle is found in the coal ashes, which form the main bulk of the mass, as the large per cent of water and carbonaceous fumes arising from these fill all the interstices of the ashes and effectually shut out the oxygen necessary to combustion. A system of cremation that will take this material, as it comes

from the garbage cart, and rapidly reduce it to ashes, without offensive odors, in any desired quantity and with due economy, is what our municipal authorities have been waiting for. Where the material, that for cleanliness and health should be burned, accumulates at the rate of two to five thousand cubic yards each day, heroic methods are required, on a scale beyond the capacity of any grate bar furnace system.

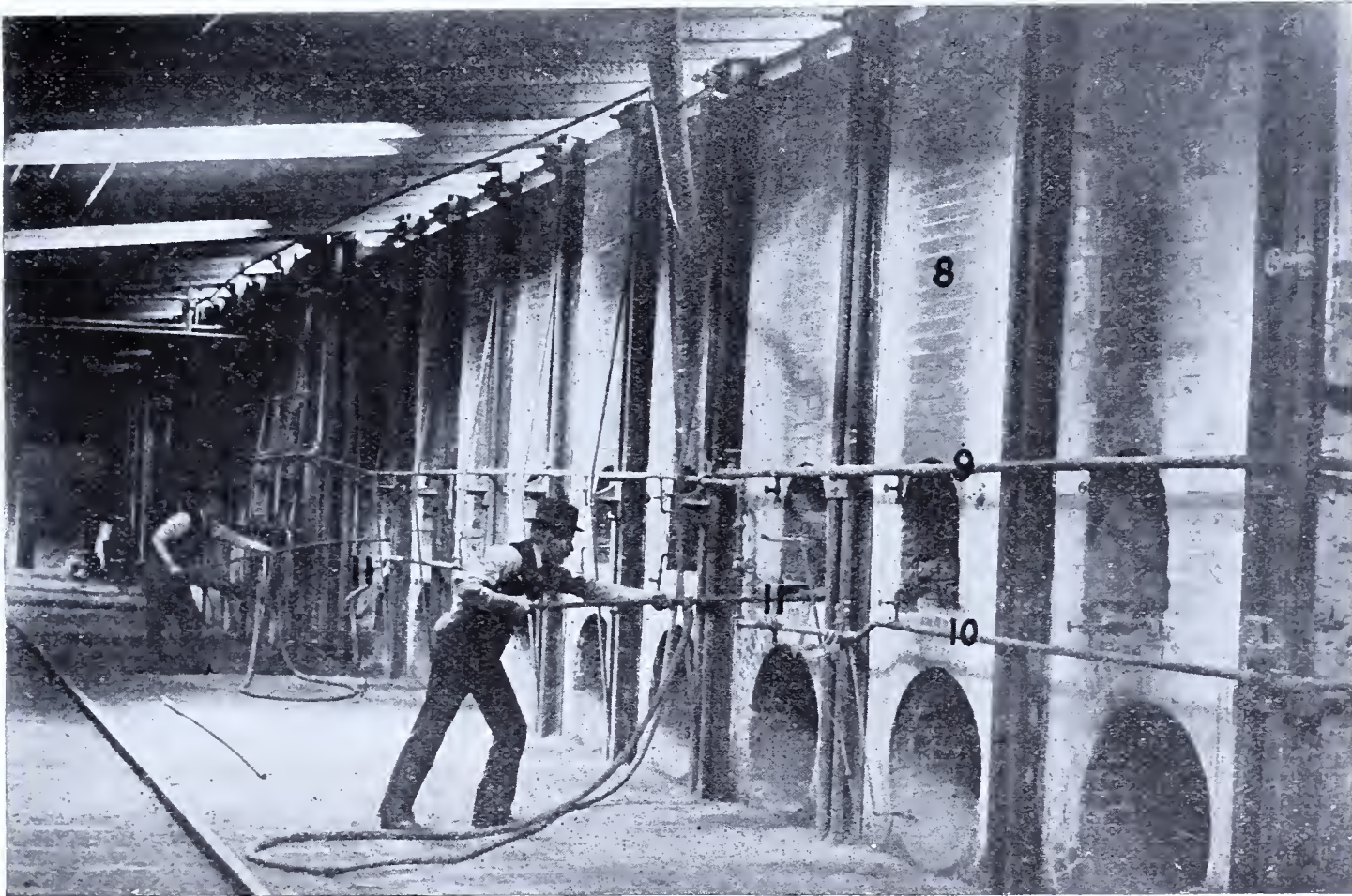
Anderson's theory is that *dry garbage* burns better than *wet*. He eliminates the water on the approach of the material towards the fire, thus drying and preparing it for further progress; meantime he utilizes the carbonaceous gases and the hydrogen of

same as the compound blow pipe, and a small quantity of crude petroleum with a large volume of compressed air being added as the moving mass of garbage encounters this blast of flame, it melts away before it like snow under a hot south wind.

The recent experiments made at Chicago to demonstrate the value of this theory were carried on in a tunnel kiln of his invention, which has been used for the past five years in the burning of pressed brick. The necessary changes were made in its construction to adapt it to the demonstration and with other temporary appliances supplied for the occasion. The experiment was conducted for several days in the presence of many visitors, with

such complete success that over 90 per cent of the entire mass was totally consumed, all that remained being reduced to fine ashes.

This tunnel, which it will be borne in mind, was not constructed for the purpose and only used on this occasion to demonstrate the main features of Mr. Anderson's plan for cremating garbage, developed an unexpected speed of over seventy cubic yards per hour, and even that could have been largely increased with facilities for moving the cars with greater rapidity. Anderson's theory was found to be correct and the problem of cremation



ANDERSON GARBAGE CREMATION.

8. Side view of a section of the tunnel.
9. Pipes for compressed air.

10. Pipes for crude petroleum.
11. Operating the "air poker."

the water evaporated, as fuel, by causing the material to first encounter, upon entering the tunnel, (which will be described later) a low heat, which increases as it slowly progresses, until reaching the centre of the tunnel, it encounters a temperature of intense heat, created and concentrated at this impinging point, by these conditions: The water at first stored up in the mass of garbage has been evaporated and drawn forward to the centre of the tunnel where in the high heat it is decomposed, and resolved into its component gases of hydrogen and oxygen, and there being supplied with excessive oxygen thrown in at that point, burns with intense heat, the conditions producing a flame precisely the

on a large scale, without offensive odors, rapidly and economically, was solved by his genius.

Complete illustration of details of construction is not given at this time, or a technical description thereof; but the accompanying engravings taken from photographs of portions of the tunnel where the experiments were carried on, together with the description of operating, will give the reader a good idea of the system, which consists first of a double tunnel 285 feet in length, with heavy walls of brick masonry and a center wall extending lengthwise from top to bottom, thus forming the double tunnel or passage ways. The top is

(Continued on page 92).

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WASHINGTON, D. C., MAY, 1894.

CHICAGO is not the only city that is struggling with the sewerage problem. The city of Mexico is building a 36-mile canal and a 6-mile tunnel.

THE extraordinary demand for copies of the April number of the INVENTIVE AGE made the printing of a second edition necessary, and it is confidently expected that the May number will reach 30,000 readers, in the United States and Europe.

THE Congress of the United States is procrastinating in the matter of the Nicaragua canal. Governmental action on this important project should not be delayed. In the improvement of water-ways this government is far behind other nations and the complete control of so strategic an enterprise, as is the proposed Nicaragua canal, is most urgent.

THE contract for the printing of the *Official Gazette* of the Patent Office and for photo-lithographing required in connection therewith, expires June 30. Commissioner Seymour is now advertising for bids for this work for the coming year, which bids will be opened on the 7th inst., in the presence of bidders. Unusual interest attaches to this matter because of the alleged irregularity in the letting of the contract last year and the congressional investigation now pending.

DURING the past month little or no headway has been made with the Nicaragua canal bill in Congress. Additional interest in water transportation everywhere is manifest, however, and Mr. Van Voorhis, of Ohio, has introduced a bill authorizing surveys and final estimates of costs to be made of the construction of a ship canal from Lake Erie to the Ohio river by way of the Ohio canal and Muskingum river. The canal is to be of sufficient capacity to transport the tonnage of the lakes to the Ohio river.

THE great strike inaugurated at noon on the 21st ult., by the coal miners all over the United States, was the result of a resolution passed at a meeting of the National Miners' Convention held in Columbus, Ohio, on the 10th ult., declaring that the wage scale and conditions adopted one year ago—the 70 cent per ton basis—should be restored. This meant an increase of from 20 to 25 per cent in wages. It is estimated that 120,000 coal miners in Pennsylvania, Ohio, New York, Indiana, Kentucky, Illinois and other States went out on a strike on the 21st ult.

WHILE the citizens of Washington are congratulating themselves on securing, through congressional aid, \$1 gas, still there would seem to be but little cause for rejoicing in the face of the fact that it can and ought to be furnished at a less rate. The city authorities of Chicago have made an extensive investigation of the gas question, and find that gas

can be made and delivered to the citizens of that city for 80 cents, and cover into the city treasury \$2,000,000 a year in the transaction. It is a fact, easily demonstrated, that the people in most of the cities are paying from 25 to 50 per cent too much for gas.

THE recent decision of Judge Caldwell, in the Union Pacific case, establishes the fact that an agreement entered into between a corporation and certain of its employes is binding on the receivers of the corporation and must be lived up to. The question of the right of organized labor to strike, or through an organized movement prevent a railroad company from performing its usual functions, was not the question involved. Judge Caldwell did not, as in the Jenkins decision, have to touch upon the conspiracy side of strikes. It was merely a question of whether or not an agreement made between a railroad corporation and its employes shall be recognized by the receivers.

IN presenting their petition against the proposed substitution of *ad valorem* duty for specific duty on lithographed work coming into this country from abroad, as proposed in the Wilson bill, the National Organization of Lithographers gave startling comparisons of wages paid skilled artists in this line in this country and in Germany. It is stated that artists in crayon in Germany receive \$9 per week, and work fifty-four hours, while those in the United States receive \$28, and work forty-seven hours. Transferers in this country receive \$25 against \$8 in Germany, and all down through the list the difference in wages is equally as marked. It is argued with much force, therefore, that any considerable cut in the tariff must result in lower wages to lithographers.

THE *Electrical World* looks with suspicion on the circumstances attending the granting of the recent canal electric franchise in New York State and expresses the opinion that the scheme not only contemplates the possession of a valuable franchise on the part of such eminent patriots as Governor Flower, Thos. C. Platt and others, but will likely result in the crushing out of smaller legitimate electrical interests now established along the route of the Erie canal. The world of progress is strewn with wrecks. The inexorable rule of the "survival of the fittest" will apply in this as in instances of competition in other lines. If by the use of the falls of Niagara the Cataract General Electric Company is enabled to furnish electricity for power and light cheaper than the local systems along the line of the Erie canal are now supplying it, then the inevitable—the crushing out of the smaller enterprises—must follow. Unless the franchise granted amounts to a monopoly in which the interests and welfare of the people are disregarded there can be no rational objection to it.

Qualification of Patent Attorneys.

The recommendation of the Commissioner of Patents favoring legislation requiring a higher standard of qualification in those desiring to practice before the Patent Office, and the further suggestion that only those attorneys be admitted as members of the Patent Office bar as are entitled to practice in the federal courts of the United States, has created a general discussion that can but result in good to the inventor. The recommendation of the Commissioner has been construed to mean that he would admit as members of the proposed Patent Office bar only regular practitioners at common law. While it may be admitted that some scheme looking to improvement in character and ability of those permitted to prepare papers and appear in cases before the Patent Office is desirable, still there are sufficient reasons why the inventor's interest will not be promulgated by confining the membership of the Patent Office bar to attorneys.

The majority of the best patent attorneys at present are not lawyers. They are engineers or scientists. They have exhausted their time in studying mathematics, chemistry, physics, mechanics, electricity, sound, light, heat, the steam engine, etc., etc., and

use this knowledge daily in drawing up papers and arguing cases before the Patent Office. Ninety per cent more technology than law is required in successful patent practice. Knowledge of law in nine-tenths of the patent cases is required principally in looking up decisions. To impose the proposed requirements would exclude from practice before the Patent Office the very best patent attorneys.

It might be well to require of patent solicitors that they shall have graduated from some technical school or scientific college, or else shall have an examination on technical knowledge. To raise the standard to the highest order of merit all lawyers ignorant of physical science and mechanics should be excluded from the proposed bar, if any now practicing are to be excluded. It is a well known fact, although inventors are not generally aware of it, that lawyers are constantly engaging technical men to prepare specifications and argue their cases before the Examiner, because they realize that such persons can write and argue about mechanical, electrical, chemical and scientific inventions better than those learned in the law only. The simple fact that one has been admitted to the bar does not, by any means, qualify him as a patent attorney. The experience of patent attorneys has been that young engineers, scientists and students of mechanical engineering, are much more useful as assistants in their offices than mere law students.

The wise inventor who wants a good patent will satisfy himself regarding the qualification of his attorney before he entrusts his case to his care. The idea of a Patent bar is a good one, provided the membership thereof is a guaranty of the ability and integrity of the attorney. The inventor, usually a stranger to his attorney, is entitled to this protection.

The Midwinter Fair.

Situated on grounds naturally picturesque the location of the Midwinter Fair in San Francisco did not necessitate the exercise of the skill of the landscape artist to that degree required in the formation of that sublime picture—the great Columbian Exposition in Chicago. Remarkable activity and pluck were required however, to plan, build and push to completion, so vast an undertaking, following on the heels of the World's Fair. Notwithstanding the universal business depression the energetic citizens of the Pacific coast metropolis have made a success out of the enterprise. The architectural beauty of some of the buildings and the artistic grouping of the same has caused much favorable comment. An illustration of the main portion of the Manufactures and Liberal Arts Building, through the courtesy of the *National Builder*, is given herewith. The style of architecture is Moorish and the architect was Mr. A. Page Brown. The building measures 225x462, with an annex 60x370. Thirty-eight nations joined in the exhibition under the roof of this structure giving the Fair a truly international character.

The Daniels Battery.

IN the INVENTIVE AGE for March appeared an item in relation to a new electric light battery invented by C. F. Daniels of Macon, Ga. A Chicago skeptic called the attention of the AGE to what he considered unreasonable and improbable claims of novelty and superiority. To these criticisms Mr. Daniels replies as follows:

MACON, GA., April 12, 1894.

DEAR SIR: We are at work on a battery to be used for power and traction purposes, which used with our motor, gives the best results. Our battery is not on exhibition, nor has it been.

We showed the lighting power of the battery to some friends, some weeks ago. We had only a limited number of incandescent lamps, and my brother attached a couple of half inch light carbons, and made a good light with these held in his bare hands. Afterwards the children played with them, one each holding a carbon; the only caution given them was, not to touch the light ends of the carbons, and get burned. We told to all we have said about the battery. If the gentleman in question will come down we can show him the workings of the battery. The writer of this has seen a great many new things in electricity since he built his first dynamo, in 1866.

Now, he will perhaps want proof of this assertion. On May 9, 1866, my attorney filed an application for caveat for an atmospheric engine, of which I have copy of the drawings, in which the bed of the engine was made into the magnets of the dynamo; the bobbins were placed on the periphery of the driving wheel, to be used in making sparks to explode the mixture in the cylinder. At the same time I showed a dynamo of similar make, for lighting purposes, to Prof. Joseph Henry, of the Smithsonian Institution, who was very enthusiastic over it. The point taken was that the iron electro magnet would hold enough magnetism to recharge the machine.

Hoping this explanation will answer the gentleman's assertions, and show him I am not quite a novice in my work, I remain
Yours very respectfully,
C. F. DANIELS.

NOTES AND NEWS.

Gold Bearing Carpet.—The woolen carpet which has covered the coiners' room in the San Francisco mint for several years was recently cremated. By refining the ashes the Government recovered 279 ounces of gold, worth \$5,500.

* * *

Primitive Gas Making.—It is said that as early as 1660 Dr. Clayton distilled coal in a retort and produced gas, which he confined in bladders, and was accustomed to amuse his friends by burning this gas as it issued from holes in the bladder pricked with a pin. This was 150 years before gas lamps.

* * *

Profits in Beet Sugar.—In the arid and sub-arid regions of the West attention is now being turned to sugar beet raising the success of which seems to have been quite generally substantiated. The Watsonville, Cal., beet sugar factory, says *Irrigation Age*, has just closed its annual run, having reduced

tral, which was at the World's Fair with the Columbia. The engineer of the Columbia says she can run from Philadelphia to Canton, a distance of ninety-one miles, in ninety minutes. She has run off, now and then, a mile in forty seconds. The Baltimore & Ohio's best record is thirty-three miles in thirty-five minutes, between Baltimore and Washington.

* * *

New Naval Militia Flag.—The Secretary of the Navy has approved a design of a special flag for the naval militia. It has a field of blue, in the center of which is a division of yellow showing a blue anchor. This flag will be displayed on all warships engaged in naval militia drill and will be used by the militia of the various states.

* * *

New Application of Electricity.—A new cure for frost bite has been discovered by Dr. Helbing, who has been successful in Germany in twenty cases, in healing people of the frozen nose. The treatment consisted in applying electrodes to the opposite sides of the nose, and passing a moderately strong current for five or ten minutes, moving the elec-

year of 313 days, at 10 hours per day, the cost per hourly horse power being 1.15 cents for steam against .23 of a cent for the water power, even at the highest price. This would be an immense advantage if the power were used all the time, which is rarely the case. The fact that the water could be used 24 hours a day would not be of much advantage to a man who never runs over 12. The figures show, however, a large percentage in favor of the water when computed on the yearly rate.—*Power*.

* * *

Burning Refuse to Generate Electricity.

There are now fifty-five towns and cities in England which destroy their garbage and solid refuse by burning, and 570 furnaces are employed for this purpose. This combustion is used for generating steam to light towns by electricity, and from the success of the tests which have already been made in this direction, many cities are contemplating the reduction of municipal expenses in this way. Improved systems of burning refuse are being proposed, and the latest of these, the Livet method, has been satisfactorily tested in England before a number of engineering and city sanitary experts. The



MANUFACTURES AND LIBERAL ARTS BUILDING, MID-WINTER FAIR.

65,400 tons of beets raised in Santa Cruz and Monterey counties, for which was paid \$5 per ton, or \$327,000, to the producers. From this product was obtained 7,800 tons of raw sugar, which, at \$60 per ton, would give to the factory for the season's run \$468,000.

* * *

New Hampshire Mica.—New Hampshire produces more mica than all the rest of the New England states together. Vermont produces small quantities, but the quality is not as good and the product is less clear than the New Hampshire production. Maine has a few small deposits and Massachusetts has here and there a bed, but none approach New Hampshire in quantity and quality.

* * *

Two Miles a Minute.—The large locomotive, Columbia, with seven-foot driving wheels, which is being tested on the Baltimore & Ohio Railroad, is making faster time than any locomotive that ever ran on the road, says the *Baltimore American*. She has been running between Baltimore and Philadelphia, and has made some spurts at the rate of nearly two miles a minute. This is the same as the famous spurt of locomotive No. 999 of the New York Cen-

trodes about. The immediate result is a reddening of the tissues, which may last several days, after which the skin and the flesh resume their normal condition.

* * *

The Bacillus of Rheumatism.—There is a new bacteriological discovery which must interest rheumatic humanity. M. Max Schuler is said to have discovered, in the joints of persons attacked with chronic articular rheumatism, bacteria, which are always identical in like cases. These bacilli are short and thick, having at each end bright grains which aniline colors make still more evident. The discoverer has been able to cultivate these bacteria in bouillon, on gelatin, or on a piece of potato. Their culture requires a temperature of at least 25 deg., and darkness is indispensable. Anti-rheumatism vaccination will be next in order in the advancement of medical science.

* * *

Cheapness of Water Power.—Power is being contracted for at Niagara at from \$8 to \$20 per horse-power per year of 365 days, counting 24 hours a day. The average cost of steam power is said by the United States Census to be \$36 per horse-power per

average quantity of rubbish burned per hour on each square foot of grate surface was 331 pounds, and four separate tests made in the presence of independent engineers, showed that 4.08 pounds of water were evaporated per pound of rubbish consumed. The refuse of the city of London is estimated to produce by this process over \$7,818 indicated horsepower, at a total cost of \$707,495, whereas the cost with the best Lancashire boiler, burning coal and evaporating 10 pounds of water per pound of coal would be \$3,995,715.

* * *

Modern Dredge Building.—A self propelling suction dredge has been completed for the Mississippi River Commission by the Bucyrus Steam Shovel & Dredge Company of South Milwaukee, Wis., that more than exceeds the requirements of the government, which were that the practical capacity should not be less than 300 cub. yds. of solid matter per hour, when discharging over a bar or bank not less than 10 ft. above the water surface, and with point of discharge not less than 300 ft. distant. The dredge had to be capable of working effectively in stiff clay and sand, of cutting its own way through a solid bank above water, of working in all depths down to 30 ft., of discharging material on either side to a distance of 1,000 ft., and over a

bank 35 ft. elevation above bottom of cut, and of admitting easy and rapid handling in a narrow channel in shoal water and in a rapid current. In the test the rate of discharge of solid material was 636.4 cubic yards per hour. The dredge has been named "Ram" and is considered one of the greatest achievements in this line ever attained.

* * *

Largest Dry Dock in the World.—What will be the largest dry dock in the world is now building at Southampton, England. It is to be 800 feet long, 110 feet wide, and will have 27 feet of water over the sill.

* * *

The Flower Kingdom.—There are 173,706 species of plants now known. Of these 105,231 are flowering and 68,475 flowerless. In 1771 Linnaeus, the greatest authority then living, only knew 8,551 plants of both kinds.

* * *

German Zinc Industry.—The fact is not generally known, perhaps, that more zinc is produced in Germany than in any other country in the world. According to Kuhlow's recent estimate, the annual exportation amounts to some 28,000 tons.

* * *

Boiling Water for U. S. Soldiers.—Orders have been issued by Gen. Schofield directing the boiling of water intended for drinking purposes in the army in order to destroy pathogenic bacteria and to reduce the danger of disease from such cause.

* * *

New Feature in Pool Tables.—R. W. Wyett, of Australia, has invented an important attachment to the pool table, consisting of inclined roads or tracks running beneath each pocket to the "spot" end of the table, in which are conducted all balls that fall into the pockets.

* * *

New York's Elevated Railway.—The elevated railroads of New York carried 221,000,000 passengers in 1893, an increase of 8,000,000 over the year previous. The number of daily trains was 3,300 and the employes number 5,000. The engines used consumed over 200,000 tons of anthracite coal.

* * *

Lenses and Prism from Russian Rock Salt.—The Smithsonian Institution is having a set of lenses and a large prism made by Mr. Brashear from a block of rock salt that was in the Russian mining exhibit at Chicago. When finished they will form the largest set ever constructed from such material.

* * *

Restricted Immigration.—Ocean steamship lines report that the number of immigrants booked by them this season is 60 per cent less than at this time last year, and official figures show that the number entering the port of New York during the past three months was 17,767 less than in the corresponding period of last year. Dull times and strictness in enforcing the immigration laws are credited with this decline.

* * *

New Atlantic Cable.—It is expected that the new Atlantic cable, the third and largest of the trans-Atlantic news carriers, will be completed by June 15. The steamer "Faraday" is now engaged in reeling out the new cable from the coast of Ireland to Canso, Nova Scotia. One hundred miles on the Irish coast and 400 miles out from Nova Scotia will be run out first and then the 1,500 miles connecting the two "buoyed up" ends will be run out.

* * *

A New French Rifle.—A French inventor has perfected a magazine gun which it is claimed surpasses all others in every particular. It is extremely light, and can fire 100 cartridges without overheating the barrel. Its recoil is so slight that the soldier is never troubled with it, and its 100 cartridges, which are less than one-half the weight of the same number of cartridges of any other rifle, can be fired without taking the weapon from the shoulder. The effects of its little bullets are said to be terrible.

* * *

Golden Relics in Mexico.—In one of the oldest ruins in the state of Oaxaca, Mexico, a number of very rare and interesting images, found in metal, have been uncovered. The images represent people of oriental appearance and dress, as well as priests in their robes of sacrifice. They bear hieroglyphics of unknown characters and are elaborately wrought, with fine art lines shown in every curve. The images found thus far are of gold, either wholly or in part, and are coated with some unknown enamel, which has preserved them from all harm in the many years they have been buried in the soil. The find is

the most important of the year in the domain of antiquities.

* * *

Decimal Marks.—The English style of writing decimals, (inverted period, thus 0.25), the outgrowth of a suggestion from Sir Isaac Newton, is now becoming popular in all the leading countries. As a distinguishing mark from the full stop punctuation and from its use in pointing off dollars and cents, (\$2.25) the inverted system for decimals is certainly more simple and comprehensive than the French and German style, (comma, thus 0,25) and that of the United States (0.25). The United States government printing office has adopted the English system.

* * *

No Fear from Gold Exports.—The resumption of gold exports on a considerable scale is not the danger signal as which such exports were regarded a year ago. The meaning of the present outflow of the the yellow metal is simply that at present rates of exchange, and with the large accumulations of money held by the banks, there is a narrow margin of profit in shipping gold rather than in buying bills. With a fall of half a cent or so in exchange the shipments will cease. With trade on the sounder basis which we are rapidly approaching, there is nothing to fear. —*Engineering and Mining Journal.*

* * *

An Alloy Which Adheres to Glass.—M. F. Walter has found that an alloy consisting of ninety-five parts of tin and five parts of copper adheres so tenaciously to glass that it may be employed as a solder to join the ends of glass tubes. It is obtained by adding the copper to the tin previously melted, agitating with a wooden stirrer, casting or granulating, and then remelting. It melts at about 360 deg. C. By adding from a half to one per cent of lead or zinc, the alloy may be rendered either softer or harder, or more or less easily fusible. It may also be used for silvering metals or metallic thread. —*Revue Scientifique.*

* * *

First Locomotive in Maine.—The first locomotive used in the State of Maine, away back in 1836, is shown in a recent number of Cassier's Magazine. The engine, as there described, came from England, having been built at the works of Robert Stephenson & Co., in the year 1835, and made its first trip over Bangor, Oldtown & Milford Railroad on Aug. 19, 1837. This road was then generally known as the "Neazie road," and the track was made of wooden rails, strapped with iron. The shackles used to connect the engine and cars were made of three thicknesses of sole or belt leather, held together by copper rivets, and had a hole in each end so as to hook over an upright stationary pin, bolted or driven into a rigid beam extending from the end of the car.

* * *

Liverpool's Overhead Electric Railway.—The report of the Liverpool overhead railway is very interesting to railway engineers and street railway managers everywhere. According to the figures presented the actual average consumption of coal on this railway is about 16 pounds per train mile for trains of about 38 tons weight with seating capacity for 114 passengers, running at an average speed, including stops at stations, of about 12 miles per hour; whereas the average on New York elevated railway is, as far as can be ascertained, 54 pounds of coal per train mile for trains of about 92 tons weight, including locomotives weighing 23 tons, running at an average speed of about 12 miles an hour including stops at stations. These figures are significant, and when the differing circumstances are taken into consideration, it would seem that from the standpoint of economy alone, the elevated electric railway is in a position to successfully compete with steam railways.

* * *

The Waste Heat of Furnaces.—It is well understood that the gases of combustion from a boiler furnace carry a temperature in the smoke flue of from 350 to 500 degrees, and that ordinarily all this heat goes to waste up the chimney—that is, this waste heat and the exhaust steam blowing into the air combined, carry off 75 per cent of the thermal value of the fuel, which is lost in an ordinary steam plant. But, by bringing these two sources of waste together, and utilizing the previously wasted heat of the flue for imparting 100 degrees or more of added temperature to the previously wasted exhaust steam, and bringing the latter thus reheated and re-evaporated into active and efficient service for heating purposes, a large percentage of the lost energy of the fuel is recovered and brought into use. In the various manufacturing processes requiring heat, such as boiling, dyeing, drying, etc., for which exhaust steam in its normal condition is unavailable because it is not hot enough, and for which live steam is used, exhaust steam, reheated or low pressure live steam superheated by means of a "re-heater," will accomplish all this service—heretofore

performed with high-pressure live steam—and in a more satisfactory manner, owing to its thorough vaporization and dryness. This is one of the practical triumphs of modern engineering. —*Tradesman.*

* * *

A New Fuel.—The United States Consul at Havre gives Maestracci's method of manufacturing petroleum bricks for fuel as follows: Mix one liter of petroleum, 150 grams triturated soap, 10 per cent of resin, and 333 grams of caustic soda. Heat this mixture, being careful to stir it well meantime, until solidification commences—say about forty minutes. If the mixture should tend to boil over, pour in a few more drops of the soda, and continue to stir until solidification has sufficiently progressed, then pour the semi-fluid material into molds to form the bricks, and place these in a hot room or drying place for ten or fifteen minutes; then remove them and let them cool. In a few hours they can be used as fuel. To the three elements which constitute the mixture, Mr. Maestracci recommends the addition of 20 per cent of sawdust, and 20 per cent of clay or sand, which makes the bricks more solid and less expensive. Trials of these bricks as fuel have been made at Marseilles on several tugs, and it has been found that, weight for weight, they develop three times as much heat as the ordinary coal brick, and leave no ashes.

* * *

Total Gold Production.—Director Preston, of the Mint Bureau has completed his final figures on the gold production of the United States during the calendar year 1893. The total product is given as 1,739,081 ounces, valued at \$35,950,000, which is an increase for the year of 73,455 ounces, representing \$1,518,423. The following shows the production in fine ounces for the calendar year 1893 by states, with the increase or decrease as compared with the year 1892. The value of the gold in any case may be found by multiplying the number of ounces by 20.67: Alaska, 48,863; decrease, 3,403. Arizona, 57,286; increase, 321. California, 584,370; decrease, 23,796. Colorado, 364,022; increase, 96,072. Georgia, 4,702; increase, 119. Idaho, 79,669; decrease, 3,602. Michigan, 2,032; decrease, 354. Montana, 172,941; decrease, 29,433. Nevada, 46,337; decrease, 29,654. New Mexico, 44,171; decrease, 2,229. North Carolina, 2,593; decrease, 1,207. Oregon, 79,543; increase, 7,378. South Carolina, 5,998; increase, 30. South Dakota, 193,761; increase, 3,043. Utah, 41,293; increase, 9,357. Washington, 10,744; decrease, 7,327. All other states 726.

These figures are about \$1,000,000 less than the aggregate values reported by the agents of the Mint Bureau, for the reason that the bureau officers have been unable to trace the full amount reported to the refineries and mints. The director states that his estimates are certainly not in excess of the actual production.

Outrage to the Memory of Prof. Tyndall.

Henry Goebel, the alleged inventor of the electric incandescent lamp, and Prof. John Tyndall, the great English scientist, have passed away since our last issue. They were both renowned for their scientific attainments, and especially for researches in the field of magnetism and electricity. Prof. Tyndall's investigations were not confined to any particular branch of physics, but he spent the greater part of his best years in the domain of electricity and magnetism.

The above from THE INVENTIVE AGE, of February, outrages the memory of Prof. Tyndall by coupling it on equal terms with that of a man whose only *renown* is that he set up a *claim* at a late day to having invented the incandescent lamp, a claim never proven, but which is surrounded with every trace of suspicion and fraud. Henry Goebel's name only came into prominence in the desperation of defense in a patent suit, and he was not before known for a single research or even for the possession of a fair amount of information in the "field of magnetism and electricity." He was only to the incandescent lamp what Drawbaugh was to the telephone. The name and fame of Bell and Edison have not lost lustre by such "shadows," but gain as the lights in a picture do by the *presence* of shadows. Hardly could a greater contrast of men and works have been found than Tyndall *vs.* Goebel.

ELIHU THOMSON.

The Telsemene.—This is the name given to a novel invention now in use in many of the larger hotels of the country. It is simply an improvement on the "call bell" system, whereby the guest, by simply "pushing the button," records on the annunciator below his wants in detail. The contrivance consists of a dial-faced indicator with a pointer on a pivot in the center like the minute hand of a clock. All around the rim of the dial is printed the names of the articles or the information a guest would be likely to require. Thus if he wants a doctor, a laundry list, a morning paper, a cocktail, a gin fizz, a telegraph blank, a cab, a barber, bootblack, railroad guide, etc.,—if he wants to know the time of day, condition of the weather, a theatre program, and 100 other things, all he has to do is to turn the pointer to the article or information wanted and "press the button." The annunciator below records the want and such as cannot be answered by an ingeniously arranged return call system are attended to by the bell boys. The instrument is the invention of Mr. F. B. Herzog, of New York.

An Ancient Indian Quarry.

About two miles from Clifton station on the Virginia Midland road and twenty miles from Washington, has been discovered an ancient quarry. It was first brought to the attention of Washington scientists by Miss Hetzell, of Clifton, and placed at the disposal of the Smithsonian Institution the past winter by the Hunter brothers, to whom the treasure belongs. The work of opening this quarry was assigned to Mr. Wm. H. Holmes, of the Bureau of Ethnology, and his assistant, Mr. Dinwiddie, commenced operations a few weeks ago. The result is the best exposure of aboriginal workmanship and engineering ever made in the world. After testing several pits, where the ancient workmen had gone down, Mr. Dinwiddie was so fortunate as to discover the very center of their operations. He followed them step by step down to the very last stroke they made before abandoning the site. This trench is a trifle short of a hundred feet long, forty feet wide and twenty feet deep at its head. It is to be understood that Mr. Dinwiddie's work is merely the re-opening of the work done by Powhatans, or an older people, centuries ago. It is true that the agent of the Bureau of Ethnology went to Clifton on the Southern Express train, that he was hauled four miles over a made road in a spring vehicle drawn by two horses whose ancestors were imported from Europe, that he used wheelbarrows and steel axes, picks and shovels and an excellent camera. But, after all this modern engineering his way was through soft dirt which had been rummaged beforehand by savages. It is now to inquire how the primitive quarrymen did their work. First of all we must dismiss the railroad train, the horses, the wagon and the wheelbarrow. There never had been a wheel and axle in America until the white man introduced them. The Americans of old walked, they never rode overland after they escaped from their pappoose frames. Their beasts of burden were human beings, especially women, and dogs for sledge and travois and llamas for packs. The most ancient quarrymen of the region about Washington walked out to Clifton and hauled away the spoils on their back. This is the reason why in those ancient days centres of exploitation were also temporary centres of manufacture. It was to save freight and a long haul of useless material.

These primitive quarrymen had stone axes for steel axes, a stick of hard wood charred in the fire in the place of a crow bar, picks of antler instead of steel, hoes made of the shoulder-blade of the deer, baskets for wheelbarrows and hands for shovels. They did not clean out the great trench one hundred feet long into the hill as Mr. Dinwiddie did, but they commenced at the foot of the hill and dug down to the surface of the soapstone. With axes of quartzite they hacked into the stone around a given circle very much as the ice man chips into a block of ice, or as a man digs up a stump by cutting down and around it. The great block was then broken loose with a maul of stone and hewn down to the shape of an oblong vegetable dish with lugs. This was done with adze and chisels having hard chipped stone blades. As soon as a swath of pots were cut loose, the dirt and debris were thrown behind, as the terrier or the woodchuck operates, until the quarrymen exposed another good surface. The projecting and useless parts were cut off with the quartz axes, broken loose with the stone sledges, a good smooth working surface disclosed and another fresh supply of pot blocks cut loose. In doing this work they studied the grain and lamina of the stone so as to run as little risk as possible of losing a piece. Each fresh advance into the hill demanded harder labor, but gave superior material. The useless serpentine was worked out and thrown away.

I have gone thus minutely into the Clifton quarry because the opportunity rarely offers of passing by the modern ingenious appliances for accomplishing an end and all the methods of civilized men that took thousands of years to invent, until we may sit down with the very first patentees in the business.

O. T. MASON.

America's Wealth.

The total valuation of the real and personal property at the close of the census period of 1890 amounted to \$65,037,091,197. Of this amount \$35,544,544,333 represents the value of real estate and improvements, and \$25,492,546,864 that of personal property, including railroads, mines and quarries. The total assessed value of real estate and personal property taxed was \$25,473,173,418. Of this amount

\$18,956,556,675 represented real estate and improvements, and \$6,516,616,743 personal property, classified as follows: Real estate, with improvements thereon, \$39,544,544,333; live stock on farms and ranges, farm implements and machinery, \$2,703,015,040; mines and quarries including product on hand, \$1,291,291,579; gold and silver coin and bullion, \$1,158,774,948; machinery of mills and product on hand, raw and manufactured, \$3,058,593,441; railroads and equipments, including \$283,898,519 street railroads, \$8,685,407,323; telegraphs, telephones, shipping and canals, \$701,755,712; miscellaneous, \$7,893,708,821. Total number of farms enumerated in 1890 was 4,564,641, as compared with 4,008,907 in 1880, an increase of 555,734. The total area of land in these farms was 623,218,619 acres, of which 357,616,755 acres were improved. In 1880 there were 536,081,835 acres in farms, 284,771,042 acres of which were improved. Therefore, there was an increase of 87,136,784 acres of the total land in farms, and 72,845,713 acres improved. The percentage of the total land surface in farms in 1890 was 32.79, as

this line. In this building is also the home of the *Electrical World*, a high class technical journal in the electrical field. The building has a frontage of 70 feet on Broadway and 156 on Murray street, with an L of 30 by 50 feet at the rear. The building is fourteen stories high. The frame is of steel and the walls are of Indiana limestone to the fifth story, gray brick being used above this. The interior is handsomely finished throughout, the woodwork being birch. The building is entirely fire-proof and fitted with all modern electric and pneumatic appliances. The *Electrical World* occupies the entire front of the third story.

On Interesting Capitalists.

In reply to an inventor who had produced a typewriter which he claimed as one of its greatest advantages that it would facilitate composition among poets and literary men who were used to the pen, I was constrained to write as follows:

"While fully appreciating all that you say as to the poetico-mechanical possibilities of the invention, I beg to say that it would be a waste of time to approach the average capitalist on those lines. What would fetch him might be such a statement as this:

"In this gripsack is a new typewriter. Its work is in sight. It is smaller, lighter, more rapid, more durable and cheaper than any other, and if I leave it with you half an hour you can in that time learn to use it rapidly and turn out business letters better than with a pen, and will want to keep my sample. I wish to arrange for its manufacture and introduction on a large scale all over the world. Do you want to see it with a view to putting money into it if it does all that I say it does and all that you think it should do?"

If you were to tell him as you tell me, that you had been forty years producing it, he would perhaps think that it would take another forty years to complete or improve it and would not touch it. If you were to say that you had long ago refused to exhibit or sell it he would, perhaps, say that you were impracticable, and would think you would probably kick over the traces if a deal was made with you, or he might think that you had in that time invented a dozen machines and would doubtless offer the best ones elsewhere after unloading the poorest ones on him.

Success with such men will lie in the belief and practice of the idea that a straight line is the shortest distance between two points. Always go at them without prelude; never produce after claps; always give a prompt straight answer to a direct question, instead of being offended if anything is doubted or not understood. In the belief and practice that a yard has in it just thirty-six inches at all times, and that knaves give less and fools give more you can obtain their attention and retain their confidence.

The average business man or capitalist has usually learned by experience how to pick out good things and avoid poor ones and risky bargains. Half the time he has lost much more than he has saved. You must assume that he will meet you only on such lines as will show him where he can spend ten and reap one hundred or one thousand."

Rich Silver Mines.

Prof. W. H. Parks, who has spent several months at the famous silver mining camp of Creede, Colorado, contributes an article to the *Pennington Seminary Review*, in which he illustrates the richness of some of the mines now being worked in that camp. While many mines have been obliged to shut down on account of the low price of silver, the large mines are kept running owing to their extraordinary richness. It is stated that, in consequence of the reduction in freight rates, and in wages, the owners, who are Denver capitalists, are making more money now than ever before; it is further asserted that the ore could be worked, even if silver should drop to 35 cts. an ounce.

"Tips to Inventors."

This is one of the most instructive and useful works for mechanics and inventors. Its author is Robert Grimshaw, M. E., and the book, cloth bound, retails for \$1. The *INVENTIVE AGE* for one year and "Tips to Inventors" will be sent to any address for \$1.50.



NEW POSTAL TELEGRAPH BUILDING, NEW YORK.

compared with 28.20 in 1880. The value of these farm lands, including fences and buildings, was, in 1890, \$13,279,252,649, and in 1880, \$10,197,096,776. The value of farm implements and machinery in 1890 was \$494,247,467, and in 1880, \$406,520,055. The value of live stock on hand June 1, 1890, was \$2,208,767,573. In June, 1880, it was \$1,500,384,707, showing an increase of 47.21 per cent since 1880. The value of farm products in 1889 was \$2,460,107,454. The total number of horses on farms and ranges in 1890 was 15,258,783; swine, 57,425,287; meat cattle, 57,648,792, and sheep, 35,935,364. The total area devoted to cotton production in 1889 was 20,175,270 acres. The area devoted to the cultivation of cereals in 1889 was 140,217,545, acres, and the total production 3,518,816,904 bushels.

The New Postal Telegraph Building.

The magnificence of modern office buildings is equalled only by their extreme height, made possible by the invention and discovery of new processes for the manufacture of structural steel and fire-proof building material. The new Postal Telegraph building in New York is the latest triumph in

Recent Experiments in Mechanical Flight.

Leaving out perpetual motion, there has been no idea more delusive than mechanical flight. Without considering Daedalus, who was said to have flown across the Aegean sea on artificial wings, or Elmerus, who flew a short distance from the top of a tower in the 14th century, and others who had the desire to fly and the daring to try, before aerial knowledge was at all widely disseminated or well founded, the attempts to navigate the unstable atmospheres which have been made in the last hundred years are astonishingly many, the majority of them being utter

In the U. S. Patent Office more than a hundred patents for flying machines, not one of which has ever made a record as a flyer, or astonished anyone but its inventor, because it would not fly, attest the flightiness of an uncertain kind of genius. Air travelers imitating birds, ships, fish, bicycles and other things, with wheels, bands, rods, springs and sails, are seen in this Department. But the only thing which suggests the possibility of sustained flight is the inevitable balloon attachment.

The balloon, though imperfect as a traveller, has made a reputation in which there is considerable credit and evidence of future success, in spite of the repeated failures of a number of air ships to fly at all, and the difficulties of aerostation.

18 feet in diameter, by engines of the lightest kind, and guided by a small shifting screw rudder, situated in the rear of and above the propellers, to be moved from left to right. An equilibrium adjuster, such as that used in "La France," could be used; and air compressed in tanks so as to be let out in ascending and pumped in for descent, could be utilized for ballast.

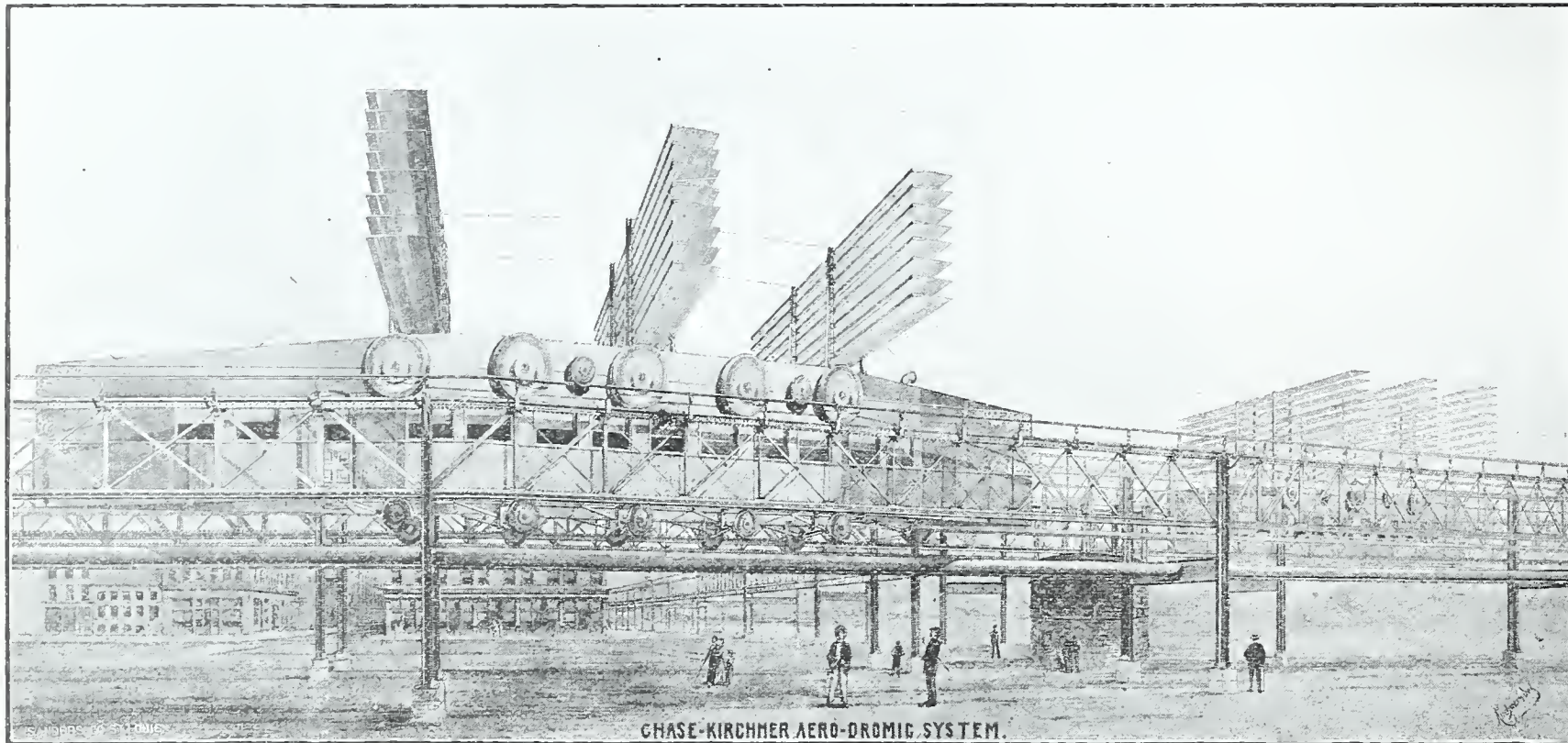
A war balloon of these dimensions should carry three or four men, a supply of explosive material and two machine guns, and with little trouble hover over a ship going at the rate of 30 miles an hour, while dynamite and other destructive munitions could be dropped down, to the vessel's undoing.

The latest and most unique machine intended for aerial navigation, is the new experiment, called "Aerodrome," (air-runners), which is based strictly on the principle of mechanical flight.

This radical departure from the balloon theory establishes only the possibility of flight without demonstrating its practicability. The aerodrome is constructed upon the aeroplane idea that suspension in the air is dependent upon the continuity of flight wherein the planes that support the air-craft glide over the air at an angle and by the lifting resistance of the atmosphere cause the aerodrome to keep up as long as motion lasts.

The soaring of the eagle and buzzard at immense heights and in an atmosphere less capable of floating heavy bodies than that of lower altitudes, presents an idea which has at last been taken advantage of.

This invention is now being developed by Lieut. G. N. Chase, U. S. A., and H. W. Kirchner, F. A. I. A., St. Louis, and is elaborately described in a comprehensive monograph entitled "The Coming Railroad; The Chase-Kirchner Aerodromic System of Transportation," in which the assistance and personal courtesy of Dr. John E. Davies, Professor of Mathematical Physics in the University of Wisconsin,



GENERAL VIEW OF AERODROMIC SYSTEM.

failures, often ludicrous in the complete lack of practical science.

Sir George Cayley tried to solve the aerial problem, and gave it up, saying that it was only necessary for navigating the air to employ a power greater in proportion to its cause than the muscles of birds.

Marshal Ney, after spending \$20,000 in constructing his aeronautic fish, a long fish-like balloon which was intended to swim in the air as a fish swims in water, by means of wings worked by cranks—engaged the attention of scientific Frenchmen for a time as an inventive genius. But when his machine was tried, his insufficient knowledge of aerodynamics was shown by a spasmodic effort of the aeronautic fish, which ended when the machine turned over and refused to fly.

Notwithstanding the fact that there was nothing practically established in aerial navigation, a company was formed in England in 1843, called the Aerial Transit Company, which succeeded in humbugging the people into believing that the fifteen-pounds-to-the-square-inch air pressure and natural attraction would no longer keep man from soaring aloft and taking his goods to market by a fast air line. The House of Commons passed a bill for the company's constitution, and John Bull waited for a new experiment. But it was another case of sic(k) transit, which passed away like all its air bubble predecessors.

Coming down to more recent times, will be found the crude idea concerning flying continually cropping out in various expensive and useless inventions.

Of course the first consideration in ballooning is that of weight which is to be floated in the air by means of an envelope filled with gas lighter than air, the envelope to be spindle shaped, so as to offer the least horizontal resistance. After suspension and balance are obtained, propulsive force from small engines of great power, and effective steering gear, are of chief importance.

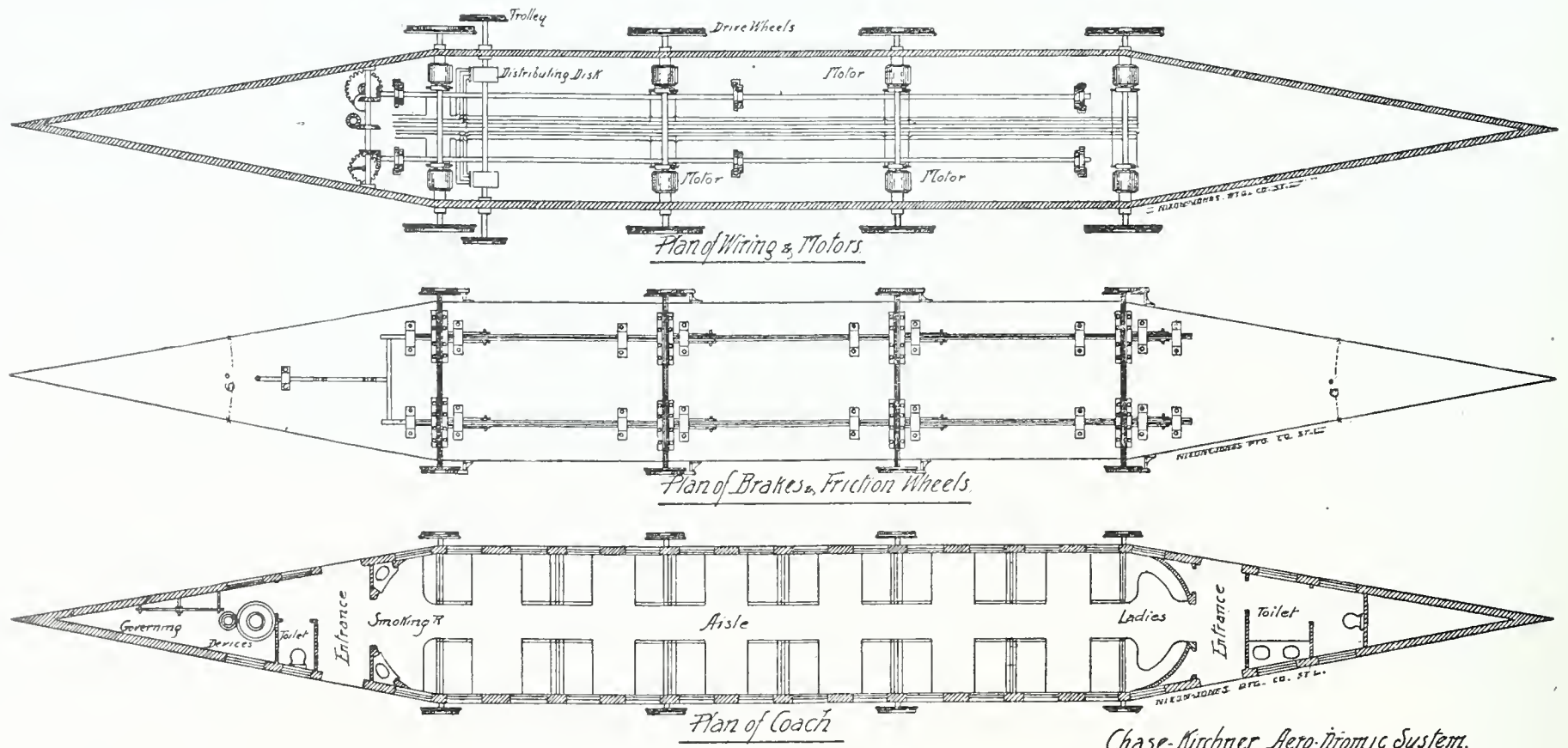


DIAGRAM OF THE CARS OF THE AERODROMIC SYSTEM.

In speaking of the requirements of the dirigible balloon of the future, especially useful in war, Capt. J. D. Fullerton, R. E., said in a lecture delivered in London, that this balloon should be in shape a trachoid of revolution, 240 feet long, 30 feet wide in its greatest diameter, with valves for letting out gas arranged so as to be easily opened and shut from the car, and with jacket and netting light but strong, as the stability of the balloon depends very much upon it. The car for an envelope of this size should be 120 feet long, 6 feet in height and breadth, having tapering ends. It should be driven with twin screws

son, and Prof. S. P. Langley, Secretary of the Smithsonian Institution, is acknowledged. Prof. Langley was the author of the recent government work entitled "Experiments in Aerodynamics."

It is argued by the inventors that the great expense in running railroads is going up grades and around curves. It is therefore proposed to abolish all curves, and devise a series of passenger coaches which are pointed at both ends so as to enable them to cut the air. They have a double series of wheels and tracks, so as to prevent them from going up or down. The track is elevated and consists of two

parallel trusses six feet in depth and about eleven feet apart.

Cars will be of different lengths, from 40 to 100 feet, and of sufficient cross-section to give all of the usual interior arrangements for comfort. They can also be adapted to all classes of freight. All cars will

from the advancing edge to the rear, this being the smaller dimension.

The axle of the trolley wheels passes through the sides of the car near the top, with journals the same as the driving axles, but in insulated bearings. The trolley wheels have a contact on the upper side of

the conductor, and being free to fall by their own weight, and that of their axle, a perfect contact will always be insured, or simply induction arms may be used. The trolley axle is provided with the usual brushes and distribution discs, fastened to the top of the car by a spring post device which keeps the brushes in close contact with the copper sleeve of the axle. These sleeves are removable, and after a certain wear, they can be taken off and recast.

An air-pump actuates a system of rods and levers underneath the car. To these are attached several sets of axles. Their wheels (about two feet in diameter) do not ordinarily engage the under side of the lower rails. The object of these wheels is to keep the car upon the track, prevent oscillation and possible swaying from side winds, and to generate a friction for traction or retardation.

Whatever the weight upon the track, the center of gravity is several feet below the line joining the points of suspension, instead of several feet above it, as in the case of the present railroads. Presupposing the fact that the aeroplanes can lift the greater part of the load upon a level or even upon a grade, there is no reason why just

enough weight should not be carried upon the driving wheels to give the necessary adhesion to the rails for traction. Upon an ascending grade it is argued that if all but this weight can be lifted from the track, and this equilibrium be maintained, but little more work will be needed to propel the car up

velocity. Lieut. Chase estimates that such a road between New York and Philadelphia could be built for \$125,000 per mile, and that the traffic would pay an annual dividend of 10 per cent upon an expenditure of \$200,000 per mile, while the service could be quadrupled if the demand required it.

For the benefit of the general public, and as illustrative of the possibilities of the aerodromic railroad, Lieut. Chase concludes with this hopeful, poetic outburst: "Journeying at 125 miles per hour, the traveler from New York would reach San Francisco inside of twenty-four hours. He could proceed to Paris via Behrings Straight in actually less time than it now takes to cross the Atlantic."

Direct Connected "Ideal" Engines.

The Direct Connected Combination of Engine and Dynamo of today is demonstrating—by an increasing number of plants—its practicability, efficiency, and sound principles. Illustrated herewith is perhaps the most modern of these Dynamo Engine Combinations yet produced. This comprises a Multipolar Dynamo of the Waddell-Entz type, driven by a Harrisburg Tandem-Compound Ideal Self-Oiling Engine. The Dynamo is 80 K. W. capacity and the Ideal Engine Cylinders 10" and 17" by 12", built for running, in this instance, non-condensing. The speed of the combination is 260 r. p. m. and it operates under a pressure of 115 to 125 lbs.

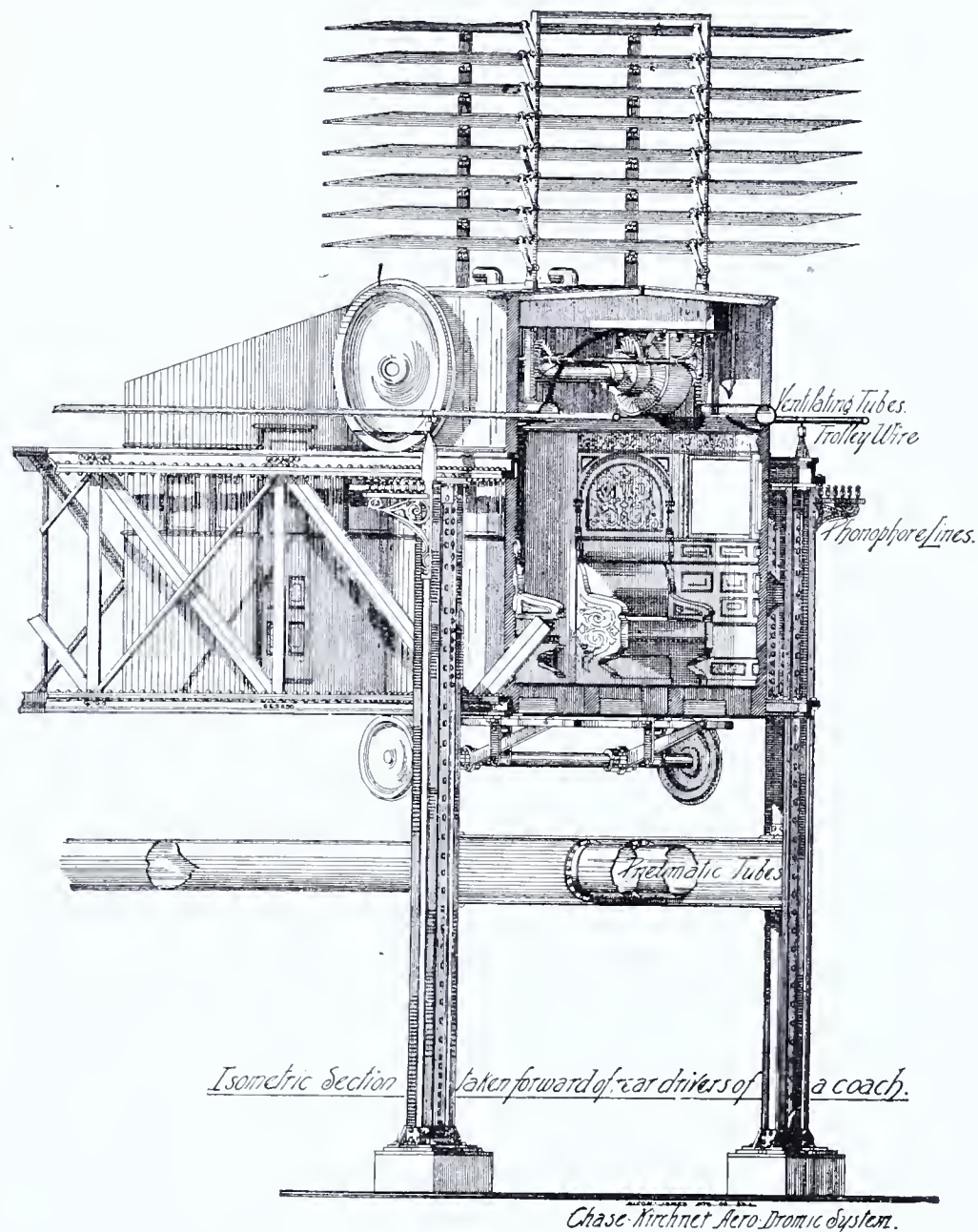
The Ideal Engine has several strong points of improvement as compared with what has heretofore been considered "good enough" practice. The self-oiling feature is shown to be a highly efficient device, all the bearing surfaces being, by its use, supplied with continuous streams of oil, by which the following very apparent advantages are obtained: 1st, perfect circulation of oil without the care and attention dependent on drop-feed and other devices for oiling; 2d, important bearing surfaces are dust-proof; 3d, there is freedom from all splashing and unsightly dripping of oil on floor and dynamos.

In direct connected work of this character it is extremely important that the dynamo should be kept as free from oil as possible, for it has been proved that short circuits of dynamos are most frequently traced to the throwing or conveying of oil from the engine to the dynamo, and of the costly results of shortcircuiting, with its attendant delays, it is not necessary to give warning.

The remarkable simplicity and heaviness of the machine is noticed, and the method of support under cylinders is considered well designed.

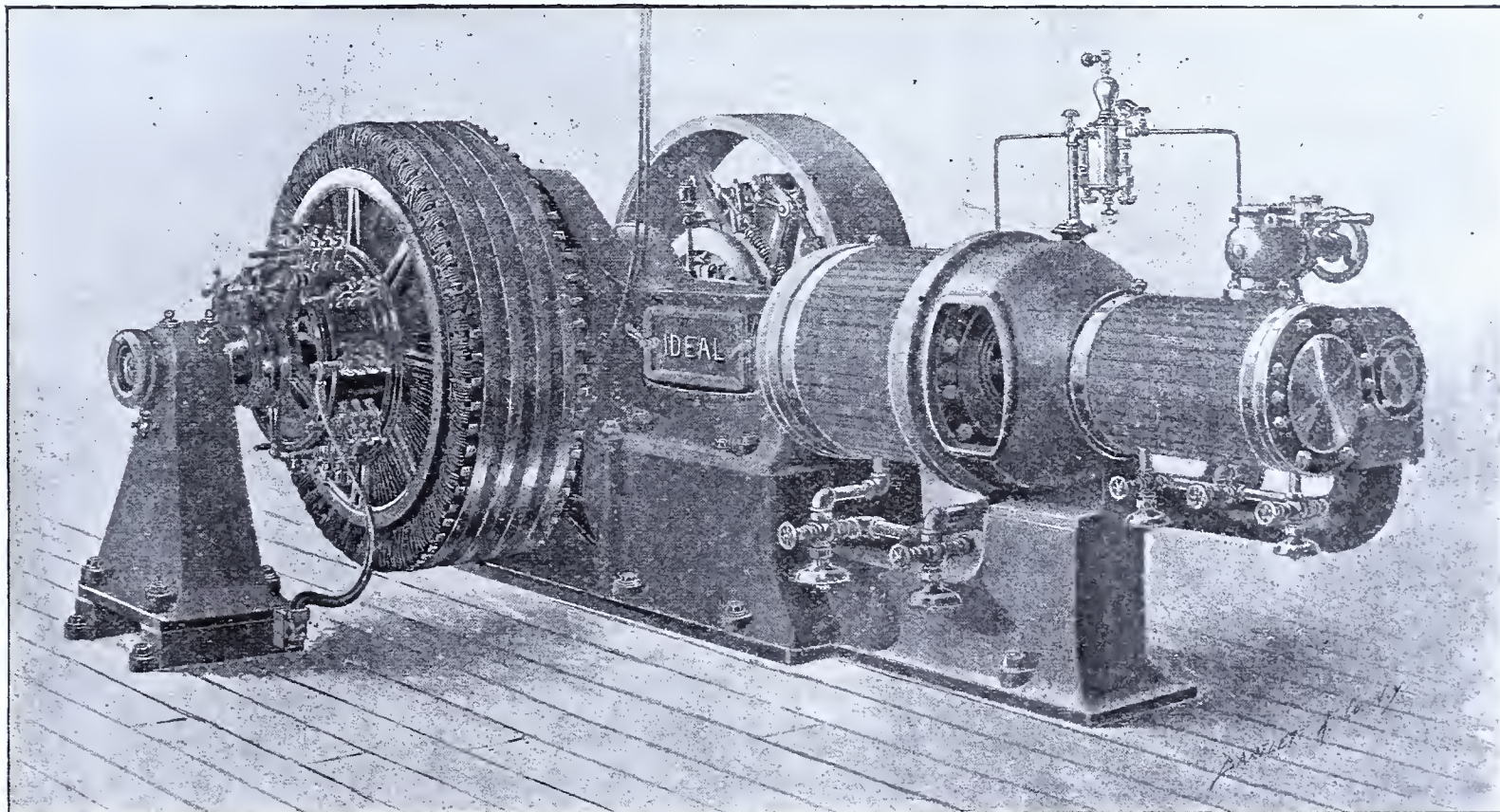
The economy of this combination is quite remarkable, since a water consumption is obtained in service of 23 lbs. per h. p. per hour non-condensing.

The Ideal Engine is the product of the Harrisburg Foundry and Machine Works of Harrisburg, Penn., and was ordered and installed at the Bridgeport Copper Co., by their representatives for New York and Boston, W. R. Fleming & Co., 203 Broadway, N. Y., and 620 Atlantic Avenue, Boston, Mass. There



necessarily be inclosed and of a stream-line form, since a body of such shape meets only with a frictional resistance in passing through the air. Cars for grain and coal will contain hopper-shaped bins, and will be unloaded from underneath. As the cars are usually to be suspended from the top, the method of building must be reversed. The sides and bottom will consist of light trussed frame-work of steel, while the top will be a strong platform, to the underside of which the motors are attached. The whole outside shell will be a continuous surface, presenting no abrupt features. The cars will be fire-proof, heated and lighted by electricity. The windows will be immovable, and ventilation will be through tubes with automatic valves.

To the top of the car and at equal distances apart are attached sets or banks of aeroplanes (technically so called), arranged in form, "aspect" and position as suggested by experiments which have been made. The area of such surfaces will vary, according to the load, from 2,000 to 4,000 square feet. These planes are hinged at their rear edge to an immovable standard perpendicular to the top of the car, and at their front edge to a movable standard by linked levers. These front standards can be elevated or depressed, thus raising or lowering the front edge of the planes. The planes in each bank, operated simultaneously by the engineer, are capable of being set at any angle from zero to 10 degrees or more. Each plane is from 20 to 30 feet in length, by four to five feet in width, and thoroughly braced. In the banks the aeroplanes will be superimposed, one directly above the other, at a distance slightly less than their width, measured



DIRECT CONNECTED "IDEAL" ENGINE.

the grade than on a level. But more work is necessary to maintain this condition of things. It is, however, not to be compared in amount to that necessary to force the load up the hill by the ordinary rolling method, and yet maintain a high

seems no reason whatever to prevent the future installation of such combinations being almost universal, since by its use is secured simplicity, minimum floor space, high economy, and noiseless running.

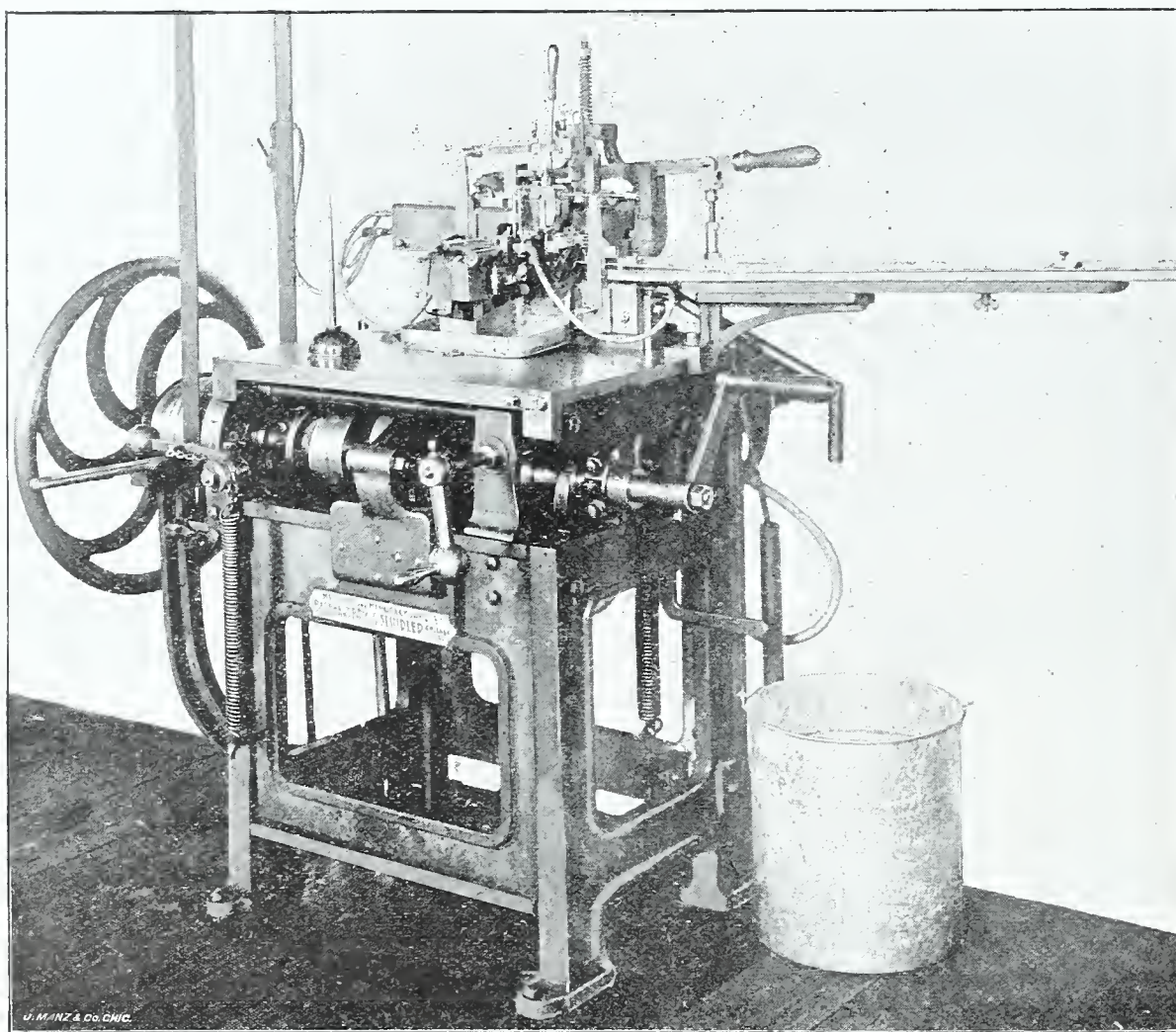
MODERN TYPE COMPOSITION.

Some Points of Interest About Typefoundry and Machines for Composing Movable Type.

Until line casting machines, with their automatic systems of justifying lines and melting pot methods of distribution, have been sufficiently improved to meet the exacting requirements of book printing, there will be an almost unlimited field for machines which handle movable type. At present the line casting machines are confined almost exclusively to newspaper work. The variation in height of the type faces, and frequent imperfect alignment, on the metal slugs can be compensated for with soft paper on rotary printing machines to an extent which gives satisfaction to newspaper publishers; but for book printing, especially where enameled and other heavy papers are used and both sides of the paper must receive an even impression, nothing has yet been presented that will give the perfection obtained from single movable type. The machines most prominent on the market in this class are ones which have been known to exist for a number of years, but they have recently been simplified and abridged to bring them within the range of operators and attendants not thoroughly versed in the intricacies of complicated mechanisms, and as a consequence the book compositor may be considered as being in the same position as was his fellow craftsmen a few years ago when the linotype machines began to be offered to newspaper publishers. In fact the several hundred typesetting machines now in use are not confined to book offices alone, but some of them are to be found in daily newspaper offices, where publishers do not deem the standard of excellence obtained in the line casters sufficiently high to meet their views of good and reliable printing. The line of progress in the field of machines built for composing movable type has not, therefore, been directed so much toward inventing machines of this character as it has been to improving and simplifying those previously invented. Some idea can be formed of the vast simplification which has taken place in this line when it is known that one typesetting machine has recently been relieved of fully one hundred working parts, and yet this machine is very much more reliable and speedy than under its old form. Other machines have been withdrawn from the market with a view of adding to them an automatic system of justification, something that everyone acquainted with the art will readily recognize as very important. The history of many machines of this character is very aptly told in the following excerpt from the *Union Printer* of January 27, 1894, and it also demonstrates why printers have felt themselves secure against the inroads of mechanical methods of type composition:

"We were handed a small four-page circular one day this week, inviting us to inspect a new typesetting and distributing machine which was said to be on exhibition at the corner of Avenue A and St. Marks place. The machine was called the Alden, and the circular said that the inventor, Mr. J. F. Slingerland, had made upwards of 300 radical improvements in it and that it was now a glittering success. We were just about to start up Avenue A in search of St. Marks Place to see this wonderful machine when we discovered that the circular was dated July, 1868! Twenty-six years have passed since Mr. Slingerland took out his patents on 300 'radical and important improvements,' and we have not heard of anyone getting fired on account of the influx of Alden machines. Can any of the old timers tell us what became of this machine?"

The situation is very much different to day from what it was twenty-six years ago. Improvements have been accepted in every feature of the printing art except that of type composition until within a very few years. The early typesetting machines, such as the Burr (now the Empire), Thorne and McMillan machines, have undergone many changes in construction and operation. Machines of the first two types named now in operation are giving good satisfaction, both as to speed and accuracy of work. It is asserted that type cannot be composed as cheaply per thousand on these machines as with the line casters, but it is freely admitted that the product of the former alone meets the highest requirements of the art. The introduction of typesetting machines will not displace proportionately as many printers as the line casting machines, at least such is and will be the case with those on the market, for the reason that a typesetting machine requires the presence of a justifying as well as a composing operator, while the line casting machines are operated by one person, with an expert mechanic usually in charge of several machines. However, as there are about 1,500 machines of both styles now in operation



AUTOMATIC TYPECASTING MACHINE—BARNHART BROS. & SPINDLER DESIGN.

in the United States, and statistics develop that they displace 44 per cent of the employed printers generally, they surely will not be less favorable to the craft when the new machines come on the market which promise to not only set movable type but also automatically justify the lines at the same time while in the hands of one operator. Although machines have been placed in some of the largest newspaper and publishing houses in the United States, yet the area of the printing world is exceedingly large and but a mere speck of it has been covered by mechanical methods of type composition.

In the typefoundry world improvement has been also been the order of the day. The typefounder, instead of casting type by hand with a jet two or three times the size of the type, or casting them in hand power machines with jet breaking attachments, now casts his type with steam power machines which automatically produce type ready for the printer's case, except as to inspection to determine if all the faces are perfect. Only those versed in the art understand the fine and exacting measurements used in typefoundry. Every type in a page must be of the same height and every type body must be on perfect lines, otherwise good paper, fine

ink and artistic type cannot be brought together and taken apart with satisfactory results. Perfect height, faces and bodies are obtained through the use of steel molds and copper matrices made by skilled workmen and used in machines where metals of the correct alloy give the desired results under pressure. But few persons more thoroughly appreciate the variations of one-thousandth of an inch than do matrix-fitters, mold makers and typefounders generally. Even with all the careful measurements and fine instruments that invention has placed at the disposal of typefounders, no one has yet perfected a machine which will cast type sufficiently accurate to permit them to be passed directly from the casting machine to the printer's case without first having been subjected to the scrutinizing gaze of the inspector, who is usually a person whose keenness of vision and years of experience enables him to detect imperfections that would never suggest themselves even to his associates in other divisions of the industry unless their attention was specially directed to them. And it is because of this great care in close measurement and scrutinizing inspection that mezzotint plates and movable type can be placed side by side and superior printing obtained with the use of fine inks and highly enameled paper.

The casting machine shown is what is known as the automatic or perfecting typecasting machine of the Foucher Bros., Paris pattern, built and improved by Barnhart Bros. & Spindler, Chicago, and employed by this firm in the manufacture of their superior copper-mixed type, used throughout the body of *THE INVENTIVE AGE*.

This machine not only casts the type, but performs all the intermediary operations necessary to the finishing of type cast by the old way, such as breaking off the jets, rubbing off the two sides, dressing of the body and grooving of the jet end of the type. The type is cast singly and follow each other through the channels, which contain the dressing and grooving devices, on to a long wooden setting stick. When the stick is filled it is removed and carried to the inspector of the face, who rejects all imperfect type, and is then paged in galleys of suitable size. As a mechanical achievement, this machine is


entitled to take rank with the best work of this wonderful age of accuracy in labor-saving machinery.

To those familiar with the exacting requirements in the production of movable type, a machine that automatically performs all the necessary mechanical operations must commend itself as a veritable wonder. Machines of this class are surely destined to replace the old method of type manufacture. The distance between the plan of casting type in hand moulds in vogue in the days of our fathers and in this machine shows that typefoundry is keeping pace with modern progress.

THE THORNE TYPESETTING MACHINE.

This machine differs in construction and operation from every other one upon the market in its respective class, in that it distributes and sets type in one and the same machine. It is a gravity and rotary machine combined, uses nicked-backed type for distribution purposes and assembles matter in a continuous line and passes it in front of the keyboard operator to the justifier. The cylinder contains grooves which are not quite as deep as type are high, and these grooves are wide enough to hold some fixed body of type. The upper portion of the cylinder

moves with a step motion, and the grooves in the lower portion of the cylinder contain ribs or wards like those of a lock. Lines of type to be distributed are placed in the grooves of the upper half of the cylinder by means of special appliances for the purpose, and the nicks on the backs of the type fit the different ribs or wards of the grooves, like the yale key fits the lock, and thus the various type are passed into their proper channels in the lower portion of the cylinder, while the spaces pass out into receptacles for use of the justifier. At the base of the lower stationary half cylinder is a rapidly revolving plate, and as the operator indicates the required characters on the key board the type pass out onto this plate and are carried around to the right side of the operator and directly in front of him by means of a continuous belt, where the justifier cuts off what is approximately a line of the proper measure, and reduces or increases the space between words, as the requirements demand. The machine has a sequence keyboard, that is in traveling over the keys from one side many of them act in combination, while operating them from the opposite direction they act as separate and distinct keys. Thus the operator, with one stroke, is enabled to bring forth a complete word if the letters of which are in sequence on the keyboard and the number of letters composing the word within the range of one hand and if not, then both hands can be used, or the keys may be actuated singly. This style of keyboard construction, with mechanism speedy enough to correspond, is what typesetting machine constructors term a machine with speed limited only to the ability of the operator. Corrected matter has been produced upon this machine, at a rate of speed fully equal to 6,000 ems per hour. While this machine can be used to simultaneously set and distribute matter, it can also be run to perform either fraction with out the other. The distributing mechanism is set to operate at a speed of about 8,000 ems per hour, and the machine is supplied with sort "sticks," like



The illustration shows a large, complex mechanical typesetting machine, the Thorne Typograph, which is a circular machine with a rotating cylinder and a keyboard. A chair is positioned in front of the machine, suggesting the operator's position. The machine is shown in a side view, highlighting its intricate mechanical components and the keyboard.

THORNE TYPE

outward. The indication of the key causes a small ejector to force the proper type from the end of the channel and the type follow each down into a continuous line to the justifying operator, who, by means of a small device held in his left hand, which enables him to quickly and safely handle the type, takes from the continuous line what he considers will make a line of the measure being worked on. This leaves the right hand of the justifier free to rapidly take from the various quick responding receptacles the required spaces or quads to space out the line, very

systems where deep nicks are used. The speed of the Empire machine is said to be limited only to the ability of the operator to indicate the keys required to form the language. Some of the speed tests on this newly designed machine give almost phenomenal results. In the Monroe publishing house, New York, where a number of the machines have been in use for some time, an operator is claimed to have composed 79,000 ems of type in one day. Of course, such rates of speed are only attained by expert operators, but publishers who have used the machines for sufficient time to test their capacity beyond any doubt believe that a speed of 4,500 to 5,000 ems per hour can be easily maintained by experienced operators. For the weekending April 14, an operator of five months' experience on the Empire machine set 253,330 ems in five and one-half days, changing the measure four or five times, which, of course, reduced the total output to some extent. The combined salary of the operator, justifier and boy at the distributing machine was \$38.34, for the five and one-half days, the operator and justifier receiving a salary of \$20 per week each and the distributor attendant \$6, showing a material saving over the scale for hand composition. Empire machines are in successful operation in such New York offices as the Herald and the Monroe, Burr, Collier, and Street & Smith publishing houses.

THE LANSTON MONOTYPE.

This system provides for the use of two separate machines—one for making perforations in strips of paper and prejustifying the lines, and the other for casting and setting the type into lines. Many of the principles involved in the Lanston machine are not new, but some of the mechanisms used are cleverly adapted and remarkable ingenuity is shown in the whole combination. A very superior matrix is now being adapted to this system, growing out of the application of well-known typefounding practices to the manufacture of intaglios for the purpose. The casting and setting machine exhibited at the World's Fair and elsewhere by the Lanston company was what is termed a single machine—that is, but one strip of paper was employed in operating one casting and master mechanism. The company is now perfecting a quadruple machine, by the use of which four different strips of perforated paper are employed in actuating four separate casting devices through the means of but one general mechanism. In this new form of machine it is possible to cast and set into lines as many as four different styles of types, and as many distinct measures, simultaneously, and all of the four separate casting mechanisms can be kept in continuous operation, or any one or any number of the whole discontinued at will.

The Lanston system involves first, through the use of the keyboard or perforating and justifying machine, the actuation of the proper keys to form words and sentences. As these keys are actuated perforations are made in a strip of paper, and the dials on the keyboard machine indicate to the operator the amount of space that is being consumed. The operator, by observing the travel of the dial hands, is enabled, by a mental calculation, as he approaches or has reached the end of the line, to determine the size of space to go between each word to make the line the proper length, and by depressing the keys to give this result the perforation is made in the proper position on the strip of paper (the keyboard mechanism having actuated an indicator telling the number of words or normal spaces, to the compositor, 3-em spaces, having been used in the formation of the line). After the article has been completed, by all the perforations being made in the strip of paper, perforations having been cut in paper as one would write or a compositor set up type—that is, from the beginning of the first

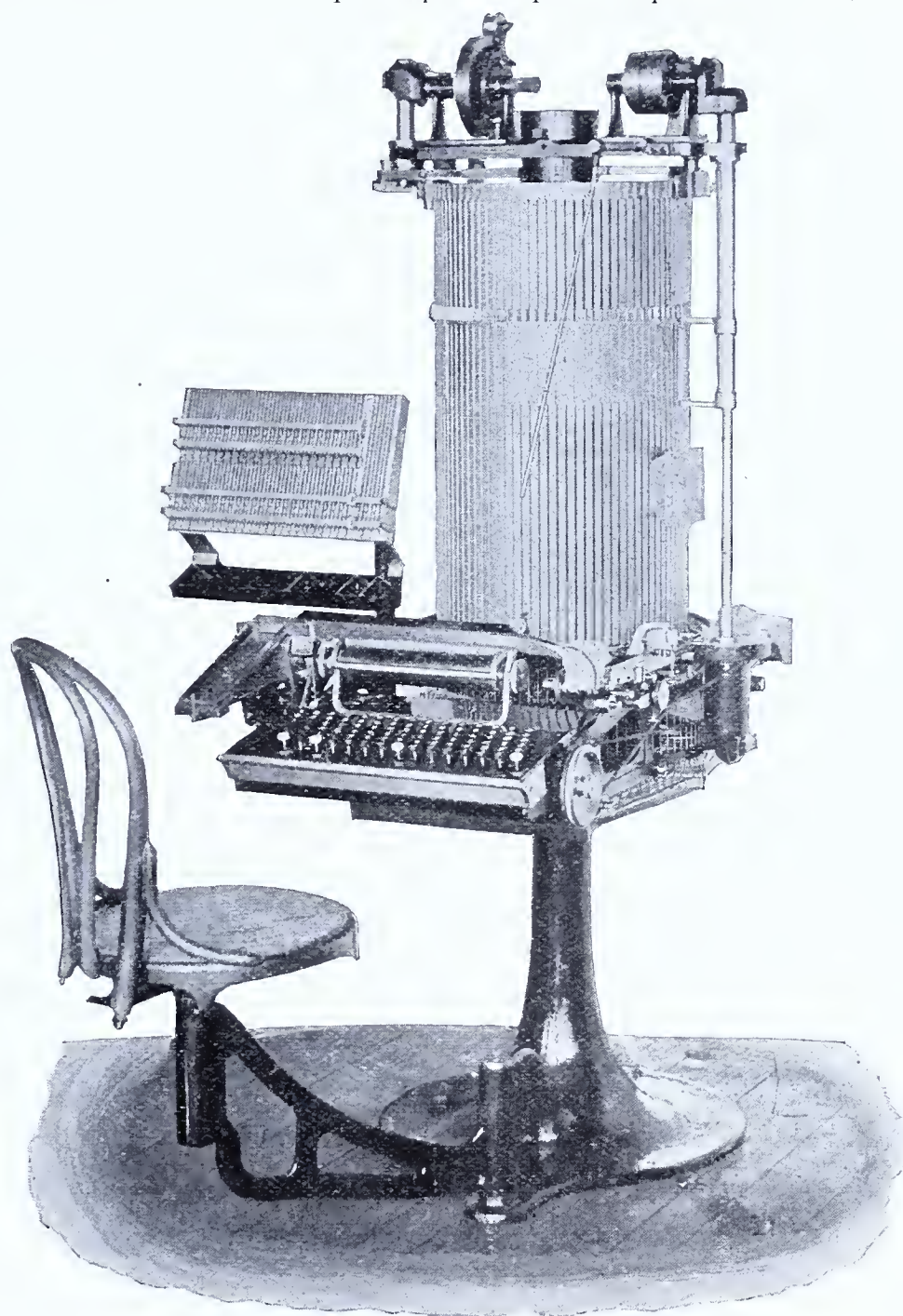
paragraph to the end (or at the end of any paragraph or wherever the operator may see fit to "make even," presumably), the perforated strip is automatically fed through the mechanism

typefounders use, to supply the grooves or channels with extra type when one letter runs short, as the printer does his case. The new style machine is accompanied with a swinging chair, to enable it to be operated by one person in handling "short take" matter in daily newspaper work. By the use of this chair the operator turns to the justifying side of the machine as soon as he has played out six lines, quickly justifies these, and feeds out other lines if there be any in the "take." There are now two hundred Thorne machines in use in America and about fifty in Europe, and the company is turning out machines at the rate of three per week. The policy of the Thorne company has been to sell and not lease machines, but under the new arrangement of leasing machines the demand has increased, and the company is enlarging its productive facilities. Fifty printing institutions are now using the Thorne machine, among them the New York Mail and Express, New York Post, Forum, Houghton, Mifflin & Co., the University Press and others. In the American Press Association office in New York, where five machines are being operated, the most expert team of operators is said to produce about 50,000 ems of matter per day of eight working hours.

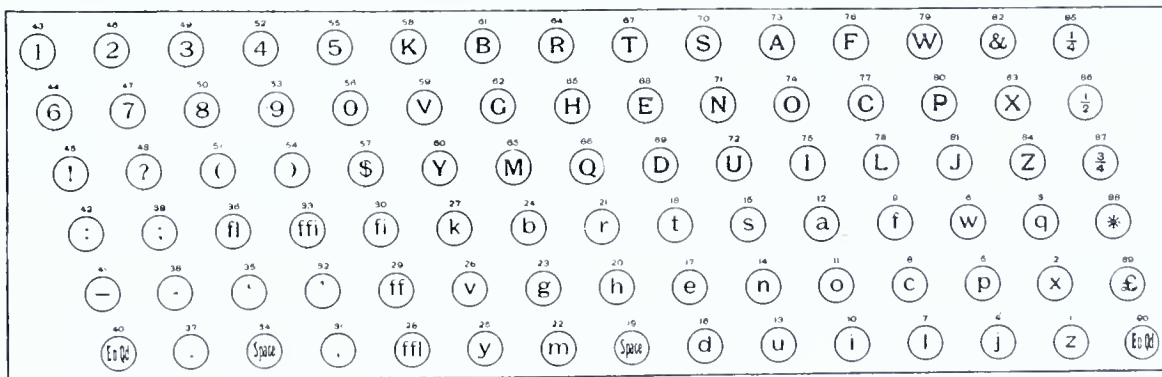
the composing mechanism, and its principles of operation are similar to that of other machines of its class. The type have a special nick on the back, and as a page or "handful" of type is placed upon the machine it automatically handles the lines and separate type and passes the latter into their proper channels for the composing machine. In the Empire system a very shallow nick is placed in the back of each type for distributing purposes, and thus they are not materially weakened, as is claimed in other

employed to bring the proper type matrix to the casting point, the type being then automatically cast and passed out onto a galley in rotation and into justified lines, which, however, are set up backward, as it were—that is, the last character of the bottom line of the article is the first to appear, and the other characters and lines follow successively in this order—from the last letter and bottom line up the column.

Those who are acquainted with the more recently



THORNE TYPESETTING AND DISTRIBUTING MACHINE.



THORNE KEYBOARD.

THE EMPIRE TYPESETTING MACHINE.

This machine was formerly known as the Burr machine, and some of the old style ones have been continuously in practical operation for several years. It has been completely remodeled, is now known as the Empire, and is essentially a gravity machine; that is the type come into the general line by their own weight, rather than by being brought there by rotary or other mechanisms. The type channels are in three cases, and when arranged ready for the operator they appear in rows with their faces

invented type perfecting machines (the Foucher and Barth) will understand that this system, with the quadruple machine, compounds the typesetting principles of these machines to obtain a four-fold product by the use of one general mechanism. The Foucher and Barth machines automatically cast, set-break and finish movable type from one single fixed matrix and mold, and pass them out into long lines on type-founders' sticks. In the Lanston system the same matrices, or individual intaglios, are used in the casting machine as are found represented in character keys on the keyboard and justifying apparatus, all assembled in compact form. When in operation this assembled form of female type or matrices is traveling, by a motion somewhat similar to that obtained in a pantagraph, and as the perforations pass into the master mechanism, in which rotary and pneumatic principles are used, the proper type matrix is brought to the casting point, the type cast and passed onto the galley, and this operation is repeated until the article has been completed. The keyboard, as well as the casting machine, carries all the desirable characters used in movable type, such as caps, small caps, lower case and italic, this feature being limited only to the desire in original construction.

None of the Monotype machines are in practical operation as yet, and mechanically, artistically and commercially speaking, the Lanston people have undertaken to solve a very difficult problem, that of perfecting a mechanical system and series of machines to supersede hand composition, of type which entail the indication of the required type characters on a keyboard machine which makes perforations in paper, combining with this operation the prejustification of lines, and then using the perforated strips of paper as a guide to an automatically operating mechanism to bring the necessary intaglios to the casting point, hold them there, cast the type and spaces and pass them singly onto a galley and in lines of correct length. This system and the several machines have been examined by such well-known persons in the typographic world as Mr. Wm. M. Patton, of Paper and Press; Mr. Wm. B. McKellar, of the McKellar, Smiths & Jordan Typefoundry Co.; Mr. Herman Ridder, manager of the New York Staats-Zeitung; Mr. W. W. Pasco and others of the

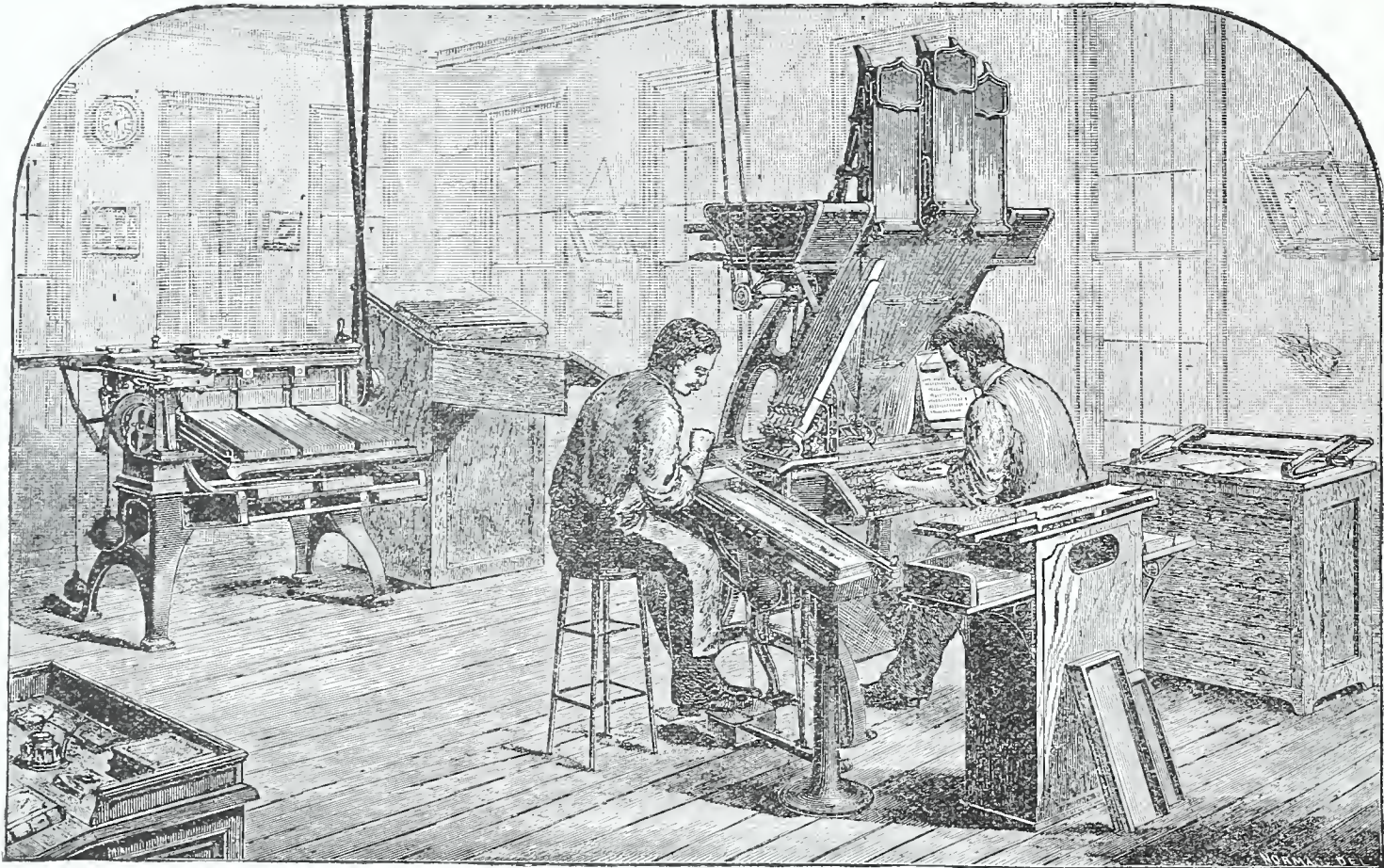
igan. The name is a familiar one to those acquainted with improved printing machinery. The novelty, general construction and operation of this

semble the type or logotypes. When the line has been assembled it is automatically justified and pushed down on to the galley, the justifying being accomplished by a mechanism which is remarkable for its simplicity. A description of it must be withheld however, until issuance of patents on the mechanism and its application.

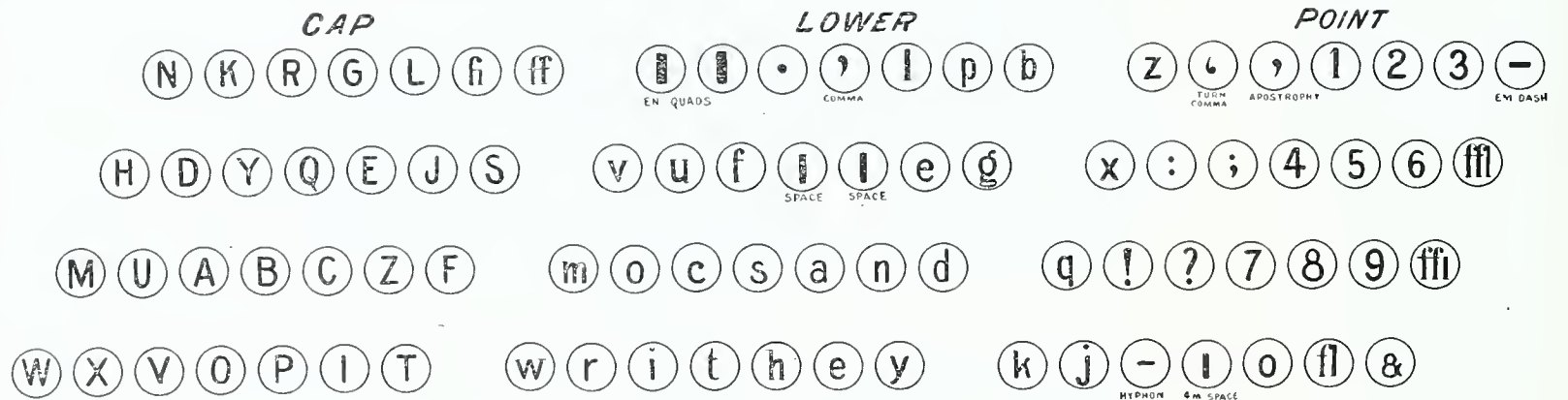
One of the novel attachments to the machine is a small electric motor. This is placed in the frame of the machine and supplies the motive power for operation and the light required. The motor is miniature in size, is operated at an expense of about one cent per hour, and can be run from any ordinary sixteen candle power fixture.

A keyboard distributing machine has a capacity of 4,000 distributed type per hour, and the type are not especially nicked for the purpose, as in other typesetting machines, ordinary movable metal type being used as by the printer at the case. The tests of the first working model machine showed its capacity to be between 4,000 and 5,000 ems per hour, and it is believed that the speed of the new machine now being constructed will be limited only to the rapidity with which the operator will be able to indicate the proper characters to correctly form words and sentences.

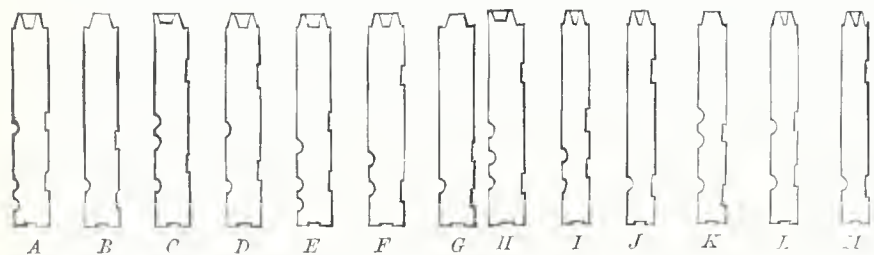
The inventors and constructors of the Cox ma-



EMPIRE COMPOSING AND DISTRIBUTING MACHINES.



EMPIRE KEYBOARD.



DOUBLE NICKED TYPE, EMPIRE MACHINE SYSTEM.

United Typothetae of America, and some of these gentlemen, and many other publishers have spoken favorably of the system and the machines, as stated in the circulars of the Lanston Monotype Machine Co.

THE COX LOGOTYPE MACHINE.

This is a machine which has been specially designed to meet the demand for a simple and cheap, though rapid, composer of movable type. It is a recent invention of Paul F. Cox, of Battle Creek, Mich-

chine practically tested since the close of the great World's Columbian Exposition, a source from which so many have drawn grand inspirations and conceptions and gathered practical ideas.

As will be noticed in the illustration, the Cox logotype machine is very compact and simple, more so than any in its specific class. The keyboard is modern and conveniently arranged. The keys have direct acting connection with the type ejectors at the bottoms of the channels, which are all vertical, side by side, on an angle of 45 degrees with each other and assembled together to form a type channel magazine. Running back at right angles with this type channel magazine, along the left end of the machine, is an auxiliary magazine, in which are thirty separate channels containing the logotypes—words and syllables cast upon one solid piece of metal—such as "and," "was," "the," "tion," "ing," etc., etc., and these logotypes are placed automatically as rapidly

into the line of composed matter as are any of the single type. In other words, the Cox machine has single type channels directly in front of the keyboard and a series of logotype channels standing at right angles to the single channels. The logotypes are released by the actuation of a single key, the same as the separate type. Running at right angles with each other, slightly below the outlet gates at the base of the typeways, are two steel conveying belts which rapidly discharge the ejected type into the assembling devices, which properly as-

semble the type or logotypes. When the line has been assembled it is automatically justified and pushed down on to the galley, the justifying being accomplished by a mechanism which is remarkable for its simplicity. A description of it must be withheld however, until issuance of patents on the mechanism and its application.

McMILLAN TYPESETTING AND JUSTIFYING MACHINE.

Some very radical changes have recently been made in the McMillan typesetting machine. The actual working parts of the composing mechanism have been reduced in number, strengthened and materially simplified, and to Mr. McMillan's general proposition to do type composition by machinery has been added an automatic system of justifying the lines of type, thus bringing the labor of preparing movable type ready to print within the range of one machine operator. In fact, the McMillan machine may be said to have undergone a complete remodeling. The new automatic justifying device was given a test equal to six months' actual work before it was decided to be of sufficient reliability to perform the required functions. With the new style McMillan machine movable type are set solid and automatically justified or automatically single or double leaded. The Remington typewriter keyboard is used

on this machine, which reduces the number of character keys. Illustrations of the new McMillan typesetter and automatic system of justification will be given in a future number of *THE INVENTIVE AGE*. Those versed in the operation of machines of this character will readily appreciate the importance of a machine which can be handled by one operator. It is said the new model McMillan typesetting and justifying machine has been tested up a speed of 9,400 ems of solid matter in one hour.

The New Army Rifle.

The first consignment of the new army gun, the Krag-Jorgensen rifle, goes from Springfield armory to the infantry corps at Fort Omaha. The new weapon weighs about eight pounds, including its knife-shaped bayonet. Its barrel is 30 inches in length; its magazine contains 5 cartridges. It can be used either as a single-shot rifle or as a repeater, and in the former case can be manipulated rapidly enough to discharge 30 shots a minute. One striking characteristic of the arm is its small caliber. The present Springfield rifle has a bore of .45 of an inch; the new rifle one of .30 of an inch only, just about large enough to admit an ordinary lead pencil, and enables the soldier to carry 175, or even 200, rounds of ammunition, instead of 100, as at present. The bullet is about an inch long, of hardened lead, coated with nickel. The charge of 37 grains of smokeless powder burns with little residuum, but smokeless is

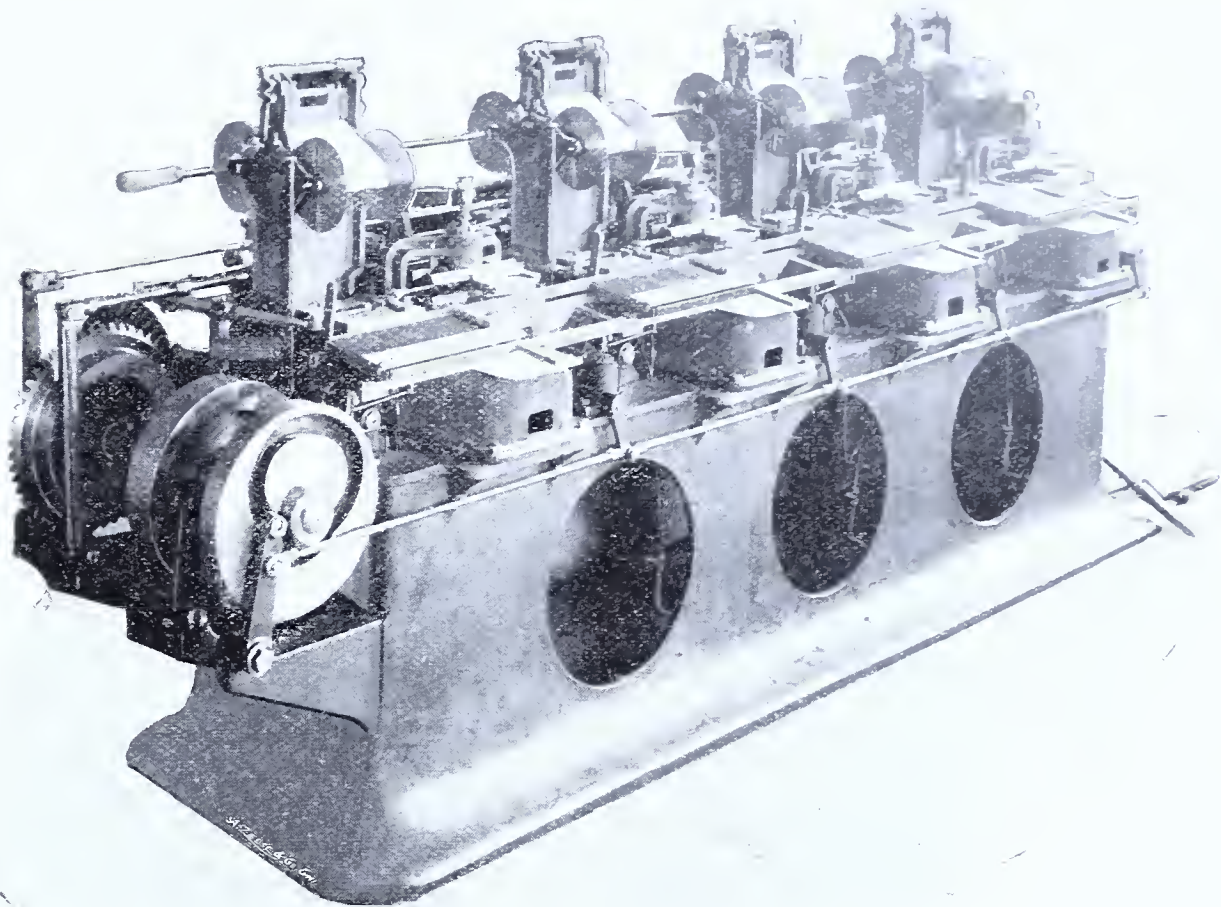
Electric Eccentricities.

The electricity that pervades space and all mind, all matter, within and without our ken, is one of the masterful mysteries that man can never conquer, for he is only finite while the fluid in question, now visible and anon invisible, is infinite and immortal. It permeates the seen and the unseen, heaven, hell, our planet and all the known and unknown stars

the public for a price, or was a few years ago when I met him at Lemar, Iowa.

The electric eel is one of the very strangest creatures in creation. Touch it, and you will think you have been struck by lightning. It frequently causes death by drowning, the swimmer being made powerless by coming in contact with its loathsome and lethal body.

If electricity were subtracted from the universe all nature, man, animal and plant would instantly



MONOTYPE—QUADRUPLE CASTING AND ASSEMBLING MECHANISM.

that make their miracle march under the command of their Creator.

I will speak only of the more peculiar forms and phases of the electric element, beginning with what is known as "globular lightning." These spheres of light are often seen at sea. They roll on the surface of the waves in dazzling splendor, and in size varying from three to five feet in diameter. Now and then one of them bursts with a crash like the very crack of Doom itself.

Tubes of glass, made by electricity, are frequently found in sandy soil. A bolt of lightning cleaves through the silicious formation, melts it, and produces a pipe of glass, the longest yet found being 27 feet from tip to tip. Artificial attempts to form such tubes have been made by directing a strong current of electricity through powdered glass, with the result only of producing tiny pipes, an inch in length and possessing the diameter of a knitting needle.

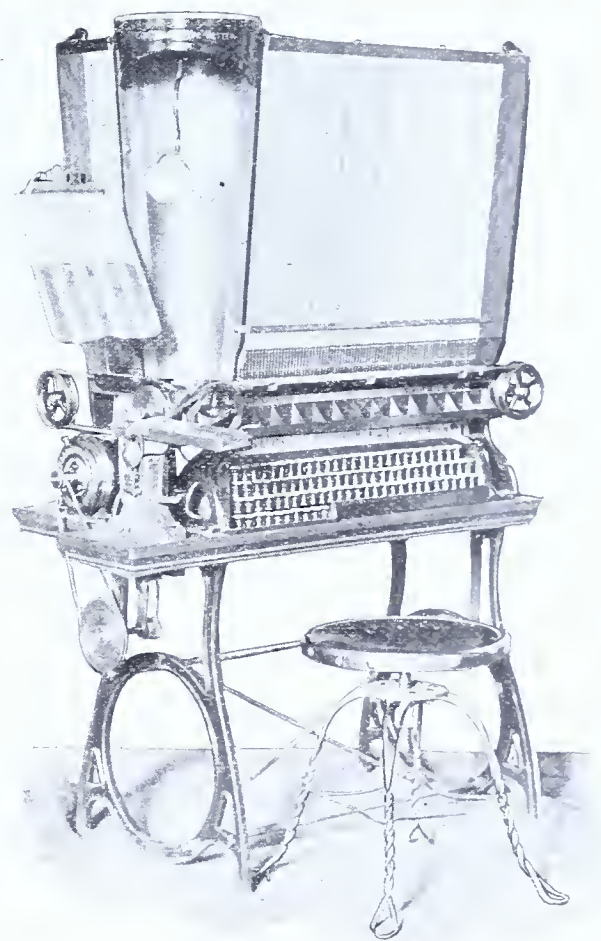
Currents of electricity are constantly playing through the earth, and when two of them strike together the result is disastrous to man, for a tidal wave, an earthquake or a volcanic eruption is invariably the upshot.

The "corpse candles" that appear from time to time on the spars of ships is a singular form of electricity. They are known to

scientists by the name of St. Elmo's fire, have the form of a bush, are the size of candles, send out a deep, strange, roaring sound, and invariably produce a panic on board of the vessel on which they appear, for they are foretokens of terrible storms, and often of wreck and death in the doomful waves.

A farm hand, named Burns, living near Kingsley, Iowa, went into the loft of a barn with two fellow-workers to wait the passing of a riotous rainstorm. A bolt of lightning struck the barn, tore the flesh off the breast, neck and thighs of Burns in long bloody strips, bored a hole through his watch, set his clothes and the barn afire, killed his two companions, passed to the floor below, knocked the life out of seven pigs, yet strange to say this man Burns still lives, and is now showing his shocking scars to

die the death: the force of gravitation would cease; a "wreck of matter" and a "crash of worlds" would follow; and this may be their final fate—the



COX LOGOTYPE MACHINE.

crowning catastrophe in store for creation and all created things. Who knows?

WILL HUBBARD KERNAN.

Names of All Patent Attorneys.

There has recently been compiled by Virginia W. Middleton, the well known stenographer, a list of all attorneys practicing before the United States Patent Office. This little volume is of incalculable value to inventors, attorneys and manufacturers. The cloth binding costs \$1.50 and paper cover \$1. Send to *THE INVENTIVE AGE*, Washington, D. C. Edition limited.



MONOTYPE—KEYBOARD MACHINE.

only a relative term. There is a smoke, or light, feathery vapor, but at a distance it is scarcely noticeable.

At a range of 200 yards it is said to have sent its tiny nickle-clad bullet through 45 inches of poplar planking. At 2,000 yards, or considerably more than a mile, it pierced the body of a horse at the shoulders, and would have gone completely through three men. At 2,800 yards it pierced 4 inches of planking, and at 3,200 yards it still had force enough to go through a human body. But while the new arm has developed this terrible power, it is true that at short ranges, at least, it lacks the accuracy of the old-style rifle, and there is some apprehension, too, that its intricate mechanism may not stand the test of hard service on the frontier.

arched over with double arches, the space between the upper and lower arches being used for the various flues, by means of which the air currents are regulated and controlled, and these are connected with brick stacks 127 feet in height, each tunnel having its own stack. The walls of the tunnel are thoroughly bound with upright buck stays of 80 lb. steel rail, 4 feet and 8 inches between centres, tied together over the top and beneath the tunnel walls with iron rods 1½ inches in diameter. The walls of the tunnel are constructed with expansive joints to permit of expansion without injury to the brick masonry. Where the highest heat is generated, the walls and arch are lined with fire brick. Through each tunnel way a standard gauge track of 80 lb. steel rail is laid. At the base, frequent arches, about 30 inches in height, are constructed in outside walls permitting access beneath the train of cars. The inside walls have an iron trough attached their entire length just below the bottom of the car floor, or platform, which is kept full of sand or water. The passage way through the tunnel is of sufficient width to permit the movement of cars without coming in contact with the walls when expanded by the heat. The cars are flat, standard gauge, each 28 feet in length. The bodies of the cars are of steel, and the floors or platforms are made of fire brick, or slabs, and are about eight inches in thickness. These platforms extend at the end so as to come in contact with the next car when coupled together, thus forming for the entire length of the train a continuous platform or floor. Beneath the outer side of these platforms a steel plate some four inches in width by ¼ inch in thickness projects down into the trough, before mentioned as attached to the side walls of the tunnel, and form, when in that position, a seal which excludes air beneath the car from entering and hot air or fumes above from escaping downwards. Each tunnel way will hold ten of these cars and permit of closing the outgoing end by iron doors, which move up and down in a groove, operated by pulleys on the top of the tunnel. When in operation, each of the tunnels is filled with loaded cars, the trains being moved in opposite directions. At each end of the tunnel there is a transfer car moved in a depressed passageway, so that the track on the transfer car will register with the track in either tunnel. The cars are moved through the tunnel by cable or any other suitable power. When a fresh car is to be placed in the tunnel it is run upon the transfer car and the latter placed in position to register with the tunnel track. At the same time the transfer car at the opposite end is placed in position to receive the car that must emerge at that end. Then at a signal the door at the outgoing end is hoisted sufficiently to clear the platform of the cars, and the entire train in that tunnel way is put in motion. As the car enters the tunnel, loading commences from a chute which forms a stationary iron door over the end of the tunnel, and when the car has fully entered it is loaded to its full capacity. In the meantime a car has been emerging from the other end which has passed through the fire, and as it comes in view a conveyor, working automatically, has worked off the ashes, usually less than a cubic yard in quantity, and deposited them in a cart or wagon, in waiting on the outside of the building. The unloaded car is at once in readiness to enter the opposite tunnel way with a fresh load on its return trip, and so the operation goes on continuously. As it enters upon its return trip with its fresh load evaporation of the water at once commences as before described.

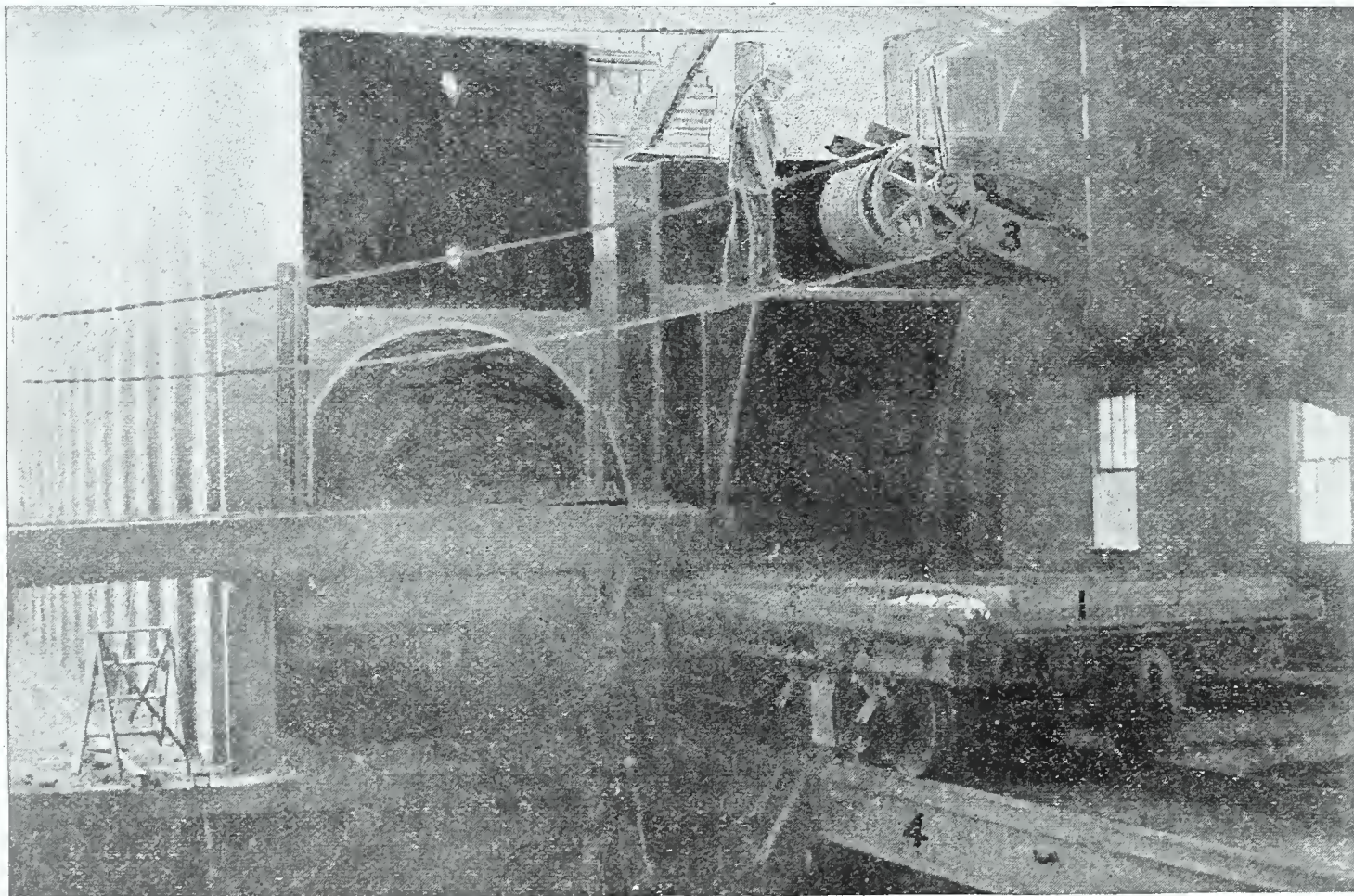
The outer walls near the center of the tunnels on each side have frequent small openings through which the crude petroleum is forced by, and mingled with, powerful currents of compressed air upon the mass of garbage. In addition an air poker, the invention also of Mr. Anderson, is used,

by which the mass is stirred with powerful currents of compressed air. This is under full control of the workmen and operated much in the manner of the nozzle of a hose in the hands of a fireman. It forces its way beneath the mass of ashes, cinders and other matter, raising them like a cloud of dust in a cyclone, and the fresh oxygen from the air adds such intensity to the raging torrent of flame that the particles are almost wholly consumed before they can settle down again.

It will be understood that crude petroleum is used freely in the initial heating of the tunnel, but after the required degree is attained, but little if any oil is required, as the gases and water utilized are, in fact, more than sufficient to carry on the work of combustion, besides furnishing the requisite steam for operating the power plant.

A plant built on this system and fully equipped with a guaranteed capacity of *one hundred cubic yards per hour*, can be constructed at a cost not exceeding \$60,000, exclusive of the land. The capacity of the plant can be increased or diminished to suit the requirements of any municipality, and it is adapted to the rapid cremation of any variety of city refuse, including street sweepings and night soil. No recent invention can compare with this in the influence it may exert upon the health and comfort of urban life.

The patents for this system are owned by the Anderson Coke, Gas, Power & Reduction Company,



ANDERSON GARBAGE CREMATOR.

1. Car entering the tunnel from the transfer car.
2. Chute through which the car is loaded.
3. Conveyor which fills the chute with garbage.
4. Transfer car.

of Chicago, of which the inventor, J. C. Anderson, is President and J. C. Cushman, Secretary. The office of the company is located at 937 and 939, "The Rookery" Building, Chicago.

Patent Office Decision Final.

Mr. Justice Brewer, in the Supreme Court of the United States, last month, announced a rule in patent law that will be of interest and value to persons engaged in claims or litigation arising out of decisions of the Patent Office. Fred H. Daniels and Charles H. Morgan both claimed to be the original inventor of an improvement in machines for coiling wire. They first contested the claim in the Patent Office, where there were three decisions, two in favor of Morgan and one in favor of Daniels. The Circuit Court for Massachusetts overruled the decision of the Commissioner of Patents in favor of Morgan, and found that Daniels was the original inventor. Quoting a number of decisions bearing on the case, Justice Brewer said: "Upon principle and authority, therefore, it must be laid down as a rule that when the question decided in the Patent Office is one between contesting parties as to priority of invention the decision there made must be accepted as controlling upon that question of fact in any subsequent suit between the same parties, unless the contrary is established by testimony which in character and amount carries thorough conviction." Under this rule the judgment of the Circuit Court in favor of Daniels was reversed, with instructions to dismiss the bill.

Names of Patent Solicitors.

Names and addresses of attorneys practicing before the United States Patent Office, carefully compiled by Virginia W. Middleton, for sale by the INVENTIVE AGE; cloth \$1.50; paper \$1. Edition limited,

Engineers as Inventors.

By EDWARD P. THOMPSON, M. E.

Before undertaking to determine to what extent inventors of engineering structures have been engineers, it is proposed to define the two individuals by means of the best authorities at hand. As nearly as possible, engineering societies have determined what an engineer is supposed to be, by appointing committees to formulate qualifications which would entitle applicants to full or associate membership. By deducing such a definition from the rules of the various societies we learn that an engineer is one who is so connected with mechanical, electrical, civil, military, mining, metallurgical, etc., engineering as to be considered competent to take charge of work in his department either as a designer or constructor, or else he must have been connected with the same as a teacher, or must have such a knowledge of, or connection with, applied science as qualifies him to co-operate with engineers in the application of professional knowledge.

Greater difficulty arises in trying to obtain an authoritative definition of an inventor. Lord Bacon goes so far as to establish inventors as those who, as it were, make "New creations and imitations of God's own work." Justice Matthews carries out

the same idea and adds to it, by stating that an inventor is one who uses that faculty of the mind which searches for new results or new methods, creating what had not before existed, or had lain hidden from vision. Perhaps the best source of a definition is that of legal cases decided lately, in regard to an invention. Referring, therefore, to Judge Butler's decision, he says that to state what constitutes invention in the legal sense is difficult of exact definition in terms. Where, however, an old device or machine in general use, with acknowledged serious defects which have long been endured, because no one had previously discovered a means of operating them, is taken in hand and by changing its form and structure they are removed, and a different and improved result is obtained, it may

safely be inferred that the change required invention. He concluded by saying that where the improvement and consequent benefit are great, very little evidence of invention is required.

Judge Butler's definition is excellent for a certain class of invention, *i. e.*, that by which known difficulties are overcome; but another kind of inventor exists. He is an inventor who does something which no one ever thought of doing, as far as any public record is concerned.

From these separate definitions respectively of the two individuals, the relation may be emphasized by saying that an inventor creates a structure, such as a new type of bridge, and the civil engineer designs and builds such a bridge for a given river or mountain pass, making it of the proper strength and dimensions. The inventor starts with a problem which has not been solved before, or else solves an old problem in a new way; while the engineer solves old problems in old ways, but the latter uses the best way out of many, and increases the efficiency over former solutions for purposes of obtaining the greatest economy. Skill is not an attribute in the process of inventing, whereas engineering success is dependent upon it. After an invention is once completed, engineers may repeat its construction in different sizes and for different purposes without the aid of an inventor.

Having compared the qualifications and attributes of inventors and engineers, the former may be interested to know to what degree inventors have been engineers, and therefore whether it pays inventors to have engineering knowledge, and engineers

to be on the watch for inventive problems. In steam engineering, the first inventor of record was Hero of Alexandria, who invented the first theoretically correct steam engine, about 250 B. C. and who produced an accurate description of it in writing. He was an engineer of varied practice, a mathematician and scientist. He designed not only steam engine, the but also the well known fountain, known by his name, and a force pump for use as a fire engine. Further he was an author of engineering works entitled respectively: Pneumatic, Belopietica, Cheiromballistras, (the latter two relating to ordnance), and Peri Automalopoietikon. These works have been preserved, but others, unfortunately have been lost.

As an engineer, Hero would compare favorably with many members of our engineering societies of the present age.

Giovanni Battista della Porta, who invented the process of pumping water by the direct action of condensing steam, in 1601, was an author of engineering works entitled "Pneumatics."

Salomon de Caus modified the above invention by forcing a stream of water from a boiler by the action of confined steam. He was a professional French engineer and an author of "Des Raisons Des Forces Mouvantes," relating to the science of mechanics.

Further modifications of employing the power of steam in raising water were made by Branca, in 1629, and the Marquis of Worcester who were authors of engineering writings. It is alleged by Cosmo, Grand Duke of Tuscany, that the Marquis' engine was constructed and put into practical use in 1656 at Vauxhall.

Watt was the next succeeding inventor in steam engineering. His name may be passed over as he is known in all historic records as a scientific man, engineer and practical constructor of mathematical instruments of precision.

□ Dr. Denis Pupin, who invented not only the safety valve and the piston in combination with steam pressure, but also Pupin's Digester, and minor inventions, was of such eminence as to possess a high reputation in the principles underlying engineering. He was a member of the Royal Society and a correspondent of the French Academy of Sciences. He was an author of many valuable engineering papers now found among transactions of both societies.

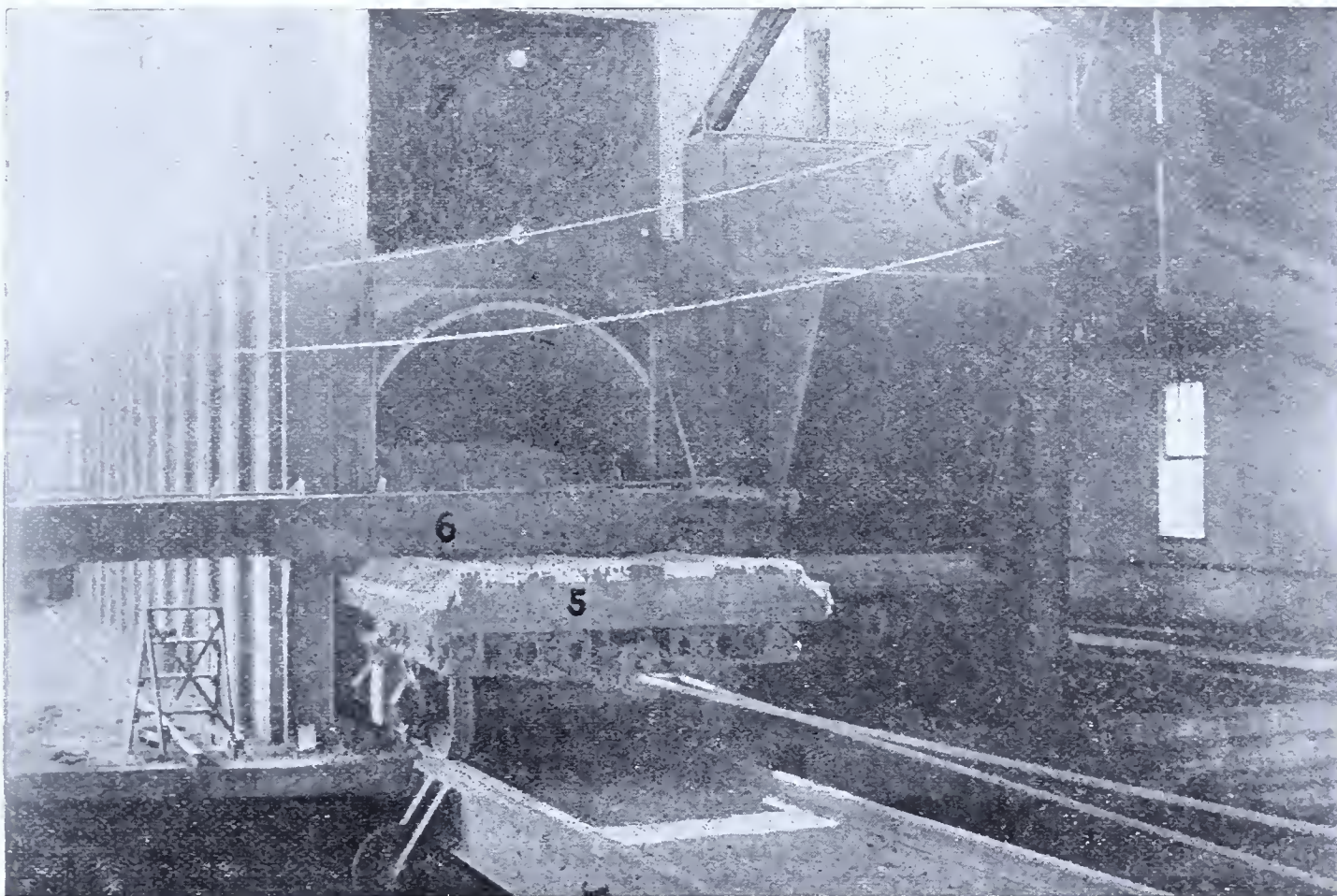
John Smeaton, who made several improvements over the Newcomb engine, but which were overlooked in view of the glory given to Watt about the same time, was very eminent as a designing and constructing civil engineer. Some of his more important structures are the Spurn light house; the noted Ramsgate harbor; the surveying for the construction of the Forth and Clyde Canal, and the constructor of part of it; the deepening of the Calder; several large bridges of Scotland; and strengthening and preserving the London Bridge. He was a charter member of the Society of Civil Engineers of Great Britain.

Robert Fulton's experience was confined almost exclusively to inventions relating to steamboats and in constructing and operating them in a practical and commercial manner. All this involved much engineering knowledge. He also made and patented inventions relating to spinning machines. He was more exclusively a successful inventor than a physicist or an engineer. Until he was about thirty-five years of age his time and energy had been almost entirely occupied as an artist.

By following this plan of investigation, the author has considered the question of scientists as inventors, and finds many instances, showing what has often been a mooted point, that engineers and scientists have been among some of the greatest inventors. The general public impression, however remains true, that important inventions involving

engineering and scientific knowledge have been made by those who were not equipped with such knowledge in general. The secret of the inventor is to save time which would be lost in studying theories, history of science, philosophical speculations, methods of planning and designing engineering structures, etc., and to spend it more in the direction of treating invention as a mental science and art, and then seeking specific knowledge which will assist him. This method, Prof. Morse's telegraph invention illustrates. He knew practically nothing about electricity, but having conceived an idea, he sought for the knowledge he wanted and found it. The author knows of a late case where a certain person knew nothing of electricity more than by its means motion could be communicated to a distance, and all the additional knowledge he found he needed, was comparatively little; and yet he worked up such an intricate but successful electric system as to be understood only with difficulty by electrical experts. All the books on electricity were useless except as books of reference where he could find useful facts. Edison started to invent the incandescent lamp by knowing practically no electrical matter except telegraphic, but he searched and found specific knowledge.

The boy who invented the device whereby a steam engine would open its own valves knew nothing about steam engineering, but he had specific knowledge to a very high degree, as to the motions of the



ANDERSON GARBAGE CREMATOR.

5. Car emerging from tunnel onto transfer car. 6. Conveyor which removes ashes from car 7. Door for closing entrance to tunnel.

valves and piston, because he had opened the valves probably several thousand times. The owners of the engine had 100 per cent more knowledge of steam engineering and science. What was the cause of the first valve operator now called the eccentric? It was the application by the boy of an inventive principle—a mental inventive principle. This is natural. An invention is a mental product, and not an engineering, nor scientific, nor mechanical product. He applied an inventive principle, namely, what may be called the automatic principle, which by its application by all sorts and conditions of men has produced hundreds of valuable inventions. This is not the only inventive principle which the writer has established as permanently upon facts as any principle in science or mechanics. The man who knows these inventive principles and seeks for places for their application has a wide field for experimental invention and will find many departments where he needs specific knowledge, and he will more than ever appreciate and realize the value of books, engineers and scientists as store houses for such knowledge, and besides will believe that invention is a science and an art even at this early day comparable with physiology or physics.

The catalogue of the exhibit of the Pennsylvania Railroad Company at the World's Fair, has been received. To briefly catalogue the extensive exhibit of this great railway requires 158 pages, 7x9. Those who visited the exposition will remember the magnificent exhibit made by the Pennsylvania system, now claiming, with assurance of justification, to be the "standard railroad of America." No World's Fair library will be complete without a copy of the Pennsylvania catalogue,

Needed Changes in the Patent Law.

Realizing the necessity of some radical changes in the Patent law, the American Association of Inventors and Manufacturers, through its Legislative Committee, urges the passage of the bill now pending before the House Committee on Patents. This bill provides for two very important additions to the Patent law.

1. It alters the present provisions of Section 4887 permitting an American applicant to file his application in the United States and then go abroad freely and secure his patents without fear that his American patent will be affected by any patents he may procure in other countries.

2. Under the existing state of the law a patent owner's right to recover for infringement of his patent in cases where suit is not brought until after the expiration of the patent, is almost worthless, for the reason that he cannot sue in equity at all, and at law he can only recover such actual damage as he can show he himself has suffered. He cannot recover profits as such. It is proposed to change the law relating to this subject and provide that the patentee may sue at law and recover profits and may sue in equity after the expiration of his patent and recover profits.

3. Under the act of 1887 an infringer must be sued within the district of his residence, a corporation in the state of its organization. This provision is full of vexation and difficulty and the present bill proposes to alter it by permitting a suit to be brought against an infringer wherever he or it has a place of business.

4. Much animosity against the patent system has grown up, particularly in the rural districts of the West, in consequence of fraudulent prosecution by unscrupulous persons claiming to be owners of patents who have traveled through the country and threatened suit against farmers and others unless a royalty was paid upon agricultural implements or some other appliance of that nature. In order to allay this animosity and gain friends for the system and bring Congress into sympathy with the purposes of the system, it has been thought necessary to exempt innocent

purchasers of articles for domestic and private use from suit for infringement until after the patent has been sustained in a court of competent jurisdiction against the manufacturer of the patented article. This change in the law will go far to gain friends for the system and enable the securing of such provision from the hands of Congress as is needed.

Gratifying Indorsements.

The following are fair samples of the letters received daily by THE INVENTIVE AGE:

AS GOOD AS SCIENTIFIC AMERICAN.

WALPOLE, N. H., March 15.

Inventive Age, Washington.

SIRS: With the last issue my subscription to your paper expired. I think it an excellent paper. If it was weekly I'd like it better than *Scientific American* for same price. It is the best paper I ever took and I enclosed \$1.35 for it another year and copy of book "Picturesque Washington."

ARTHUR E. GUILD.

CAN'T AFFORD TO BE WITHOUT IT.

CHICAGO, Apr. 10.—* * * I herewith enclose my check for \$2 to renew my subscription. I cannot afford to be without your valuable paper and would like to have you send one to my residence, Highland Park, and the other to my office.

J. C. ANDERSON.

Pres. Anderson Coke, Gas, Power and Reduction Co.

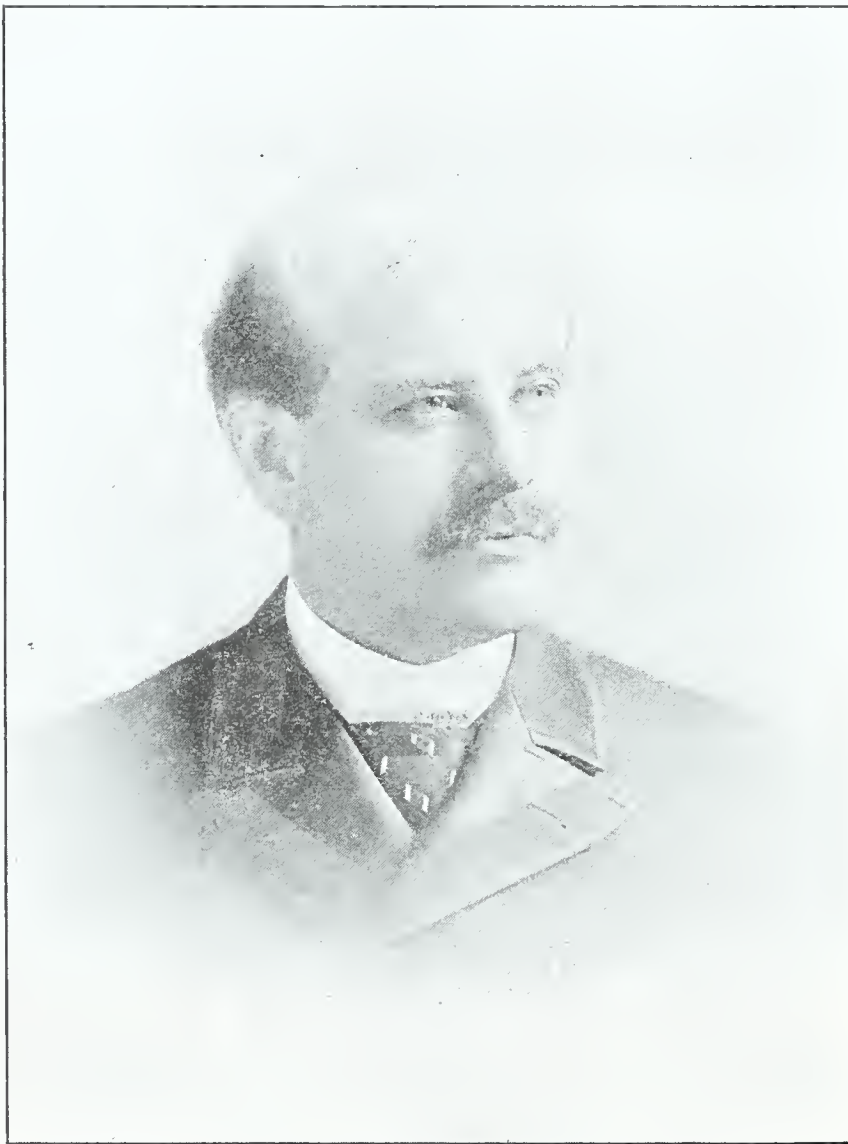
"That excellent publication is now owned by Marshall H. Jewell and Alex. S. Capehart, both journalists of approved capability and large experience. The INVENTIVE AGE * * * is of especial value to inventors and manufacturers and of prime interest to general readers as well."—*Public Opinion*,

SUGGESTIONS FROM A FINANCIER.

The Relation of Financial Investments to Patent Rights Explained.*

GENTLEMEN OF THE INVENTORS' ASSOCIATION.—You can readily understand the embarrassment under which a man labors in dealing with questions regarding which he has only a limited knowledge, in the presence of those who are experts both in theory and practice. However, desiring to show my personal appreciation of your invitation and of the fact that Washington has been selected as the place where so important an association should hold its convention, I have undertaken to discuss the interesting subject of patents for inventions, from a financial standpoint. With this object in view, I called upon my old friend "Business," for the purpose of obtaining from him information which would enable me to speak upon the topic assigned me. In my experience I have found no source from which more reliable information can be obtained. Fortunately, this morning I found this king of enterprise and development uncommonly at leisure, and upon making known my errand, he said it would give him pleasure to show me some of the occupations which were carried on under his auspices, and to make any explanations I might require regarding any of them. He went on to say that he had really become exhausted from over-exertion during several years last past and was taking a little rest, waiting for new legislation which appeared to be impending, and which would determine his action with reference to curtailing or extending many important branches of industry. One of his greatest troubles, he continued, is with the Congress of the United States: so many new members of Congress came from the people to whom they have promised reforms and improvements without proper reflection or a correct understanding of the subjects to which these promises relate, and many bills are introduced and sought to be enacted into law, which not only perplex and annoy me, but have brought about such a state of suspense as to compel me to close my factories and to suspend business enterprises, and to stop both buying and selling until Congress adjourns or a decision is reached. In fact, I do not know exactly where I shall stand at that time. You know, said he, that I speak of myself as representing the interests of the whole American people, and not from any partisan or selfish standpoint. I shall illustrate this to you more fully in replying particularly to your question as to my relations to the patent system. The Patent Office itself has grown with the business of the country, from the same small beginnings, and has become the headquarters of a vast system, the details of which are ingrown and inextricably involved in all the business of the country. Although its conduct is regulated by the laws of general government, it has never been and is not now supported by the government, but by the labors and money of thousands of inventors and of business men co-operating with the inventors. The opinion very generally prevails that inventors are a visionary set of men who are possessed of the ideas generated by them, which ideas they must work out from the sources of their own inspiration, without regard for the pecuniary consequences or hope of reward, or possibility of failure. Nothing can be further from the truth. Undoubtedly there is a certain enthusiasm in the work of a real inventor, just as there is in the work of every man who has any spark of the genius required for the conception, development and perfection of new ideas—and without this enthusiasm all his efforts would be fruitless—but it is the hope of reward that sustains him. The proof of this is the fact that he invariably comes to the Patent Office to procure from the government a certificate of exclusive right for the limited period of years which the law grants him, and until some one can point out to me, any considerable number of unpatented inventions which have benefitted the country during the

years in which the patent system has been in force, it will be impossible to believe that these inventors have not been spurred on by the hope of reward. No genius, great or small, works nowadays in any other way. The very poets whose genius is lit up by the divine flame and who soar altogether above my level, and are supposed to utterly ignore, if not to scorn all consideration of business, even these, I notice, are very particular to have the result of their genius and labor carefully copyrighted. So the inventor, who is a genius, (if not a poet) and creates new things, is of the earth earthly and, however high he may tower in fame, has his feet on a substantial pecuniary basis, and walks among that class of men with whom I am concerned. He is one of us. The prospect of royalties is the star that lures him on through days and nights of toil, and cheers him in his discouragements. It was that which sustained and cheered Goodyear, while in poverty and hunger, discouragement and distress. He sought the hard rubber, which when found, was the true philosopher's stone, and more valuable and more beneficial to mankind than any the old philosophers ever sought. It was that which sustained Morse while he harnessed and put to work the lightning with which Franklin only played. It was that which buoyed up Watt, Stevenson and Arkwright, and the hosts of others who have realized the vision of the prophet and put the spirit of a living thing in the wheels of machinery, and have gone far towards redeeming



BRAINARD H. WARNER.

toiling man from drudgery, and have brought within the reach of all, articles of daily use, formerly only the luxuries of the rich. (Here it seemed to me that the old gentleman was waxing somewhat eloquent, and not knowing to what heights he might soar, I thought it prudent to interject an inquiry by way of calling him down, so I asked if in all his years of experience he had not found that business men, his followers, were very largely and directly concerned in the development of patents). Certainly, he continued, almost all inventions require a great deal of money in the making, at least nearly all inventions which are of any value to man—a new machine or an improvement in a machine, or a new article of manufacture. It is not invented until it is made; the invention of a new machine requires that the machine be built, and it takes machinery to make a machine, a shop and workmen, and materials, and these cost money. It also requires machinery to make an article. One cannot tell whether a machine or an article is really good until it is made. In fact, thousands of inventions in machines and articles, after all the money is expended upon them, prove valueless. All the money required in the making of inventions must be furnished by the capitalist or the manufacturer, or the owner of the machine shop.

Further, after the invention is made, perfected and demonstrated to be of value, it must be manufactured on a commercial scale in order to be available and brought to the attention of the appropriate users, or put upon the market. Articles of manufacture must be made in quantities, and proper machinery for making them must be supplied. All this requires money, and often in very large amounts. Now capital, whether it be in the form of cash, or shops, or machinery, is constitutionally careful; if it were not it would soon cease to exist. It represents care, saving and prudence, wisdom and foresight, and will not move unless there is a prospect of increase. It is utterly unlike the rolling stone which gathers no moss. Now, there is this peculiar characteristic of an invention, as an object of investment. Whatever may be the abstract right by which man is entitled to his own ideas, the moment they become known to the world they become public property, unless protected by special provision of law. This special provision is the patent law which gives inventors the exclusive right to their inventions for a limited period of years. If the inventor, therefore, has procured a certificate of this legal right, he has something to sell which capitalists can buy, something concrete, tangible and substantial; otherwise the capitalist would be invited to buy mere air. Or, to put the matter in the form of illustration: If a new machine were offered to the capitalist as an investment for his capital to manufacture or to use in the competition of business, and there were no such right of property, suppose he should give the inventor money for his idea, or should, at large expense, build a shop and stock it with machinery for the purpose of making the invention and developing it into a practical and profitable form, and after he has spent his money in this way, any one could step in and begin where he left off and manufacture, without license from him, on equal terms, all the investment would then be lost; and no prudent man would make a large outlay on such conditions. But if a capitalist who is asked to develop an invention, to introduce it to the public and create a demand for it, knows that he will have the exclusive right, for seventeen years, of that improvement, then the additional gain due to the improvement will be sufficient to justify the investment of his money and the risk which he may incur. As a matter of fact, four-fifths of the manufacturers of the country have been more or less engaged in the making of patented inventions, and the business relating to it would not have been developed at all under precisely the same conditions, without the protection of patents. The old saying that "Money makes the mare go" has been changed, and now it reads, "Money makes the machinery go."

What has been done under the joint efforts of the inventor and capitalist surpasses the possibility of telling and in this country alone surpasses conception of the broadest and best informed mind, and it is due solely to the fact that the law has held out to the inventor and to the capitalist the hope of reward. It is this hope that stimulates and brings out almost all effort, and it is all so familiar to us that, like the air we breathe, the magnitude or value of it does not even impress us. It has become habitual to send our thoughts with lightning speed from city to city, and from country to country, and we realize the dream of the poet and "put a girdle around the earth in thirty seconds," without knowing what is done.

If we could stand on some great elevation and look down upon the whole vast stretch of this country at once, and see the network of railroads, with trains coursing thereon from town to town, from ocean to ocean, and over all the intermediate space, we should even then only faintly conceive the vastness of it. It is a mighty system of arteries and veins in which the life blood of civilization courses. It is the very life and essential condition of business. Yet on every foot of the road, and in every part and piece of every train and locomotive, there is the work of the inventor, aided by capital and the skill of the business man. We talk about the great armies of Europe, and we have a standing army more wonderful and more beneficent and more obedient to will. It is the army of harvesters, which in divisions and brigades, on the great farms, and in squads and files on the smaller, stands always ready for action, and at the sound of the harvest horn. Beginning at the South and proceeding northward, it moves in a mighty line of battle, extending over a thousand miles. In front of it are the waving grain fields; behind it lie the scattered bundles. No army of living men could be organized, or sustained or kept ready and obedient for such work as this. If this army of machines were swept out of existence, the grain fields would perish ungathered, a calamity inconceivable. Yet all this has been accomplished by the combined efforts of the inventor and business man.

What shall I say of all that great host of textile machines, some of which, with quick steel fingers, knit ten thousand stitches a minute, and shape garments as if with instinct, with intelligence; of looms that weave unattended, and ornament the web with a small nap, or adorn it with figures and flowers of the brightness of a garden. The shops are full of

*Paper read before the American Association of Inventors and Manufacturers at Washington, D. C., January 16th, 1894, by Brainard H. Warner, President Washington Board of Trade.

these machines, and the wonderful machinery unerringly selects from the wilderness of varied colored shades, threads and interweaves them into pictures of fruits or flowers, and all the shapes that the artist's eye can conceive. The shops all over the manufacturing portions of this country are full of these. The skill of the machine surpasses in accuracy and in nicety of action the most skilled fingers of the best trained workman. The innumerable and subtle fingers, which from the warp of sun-beams and woof of showers, weave the green and flower-decked carpet of the spring time, are no more deft or busy than the fingers of steel which the inventor has created, and which work daily in all our factories, untiring and uncomplaining, willing and obedient. Their work fills the stores and markets with soft fabrics, with gauzy lace, with brilliant hued carpets, and with all that luxury and necessity demand, and in abundance. They descend to the houses of the poor and have transformed luxuries into articles of common use. Three hundred years ago knitted silk stockings were considered a fit present for Queen Elizabeth, and now you can buy them for \$2.00 a pair. In fact, machinery has done more for the poor man than the rich, who could always be supplied—patient hands and innumerable toil for them; but until the inventor, and his help-mate, the business man, stimulated by the beneficent patent system, had come into the field, the poor toiled for the rich and nobody toiled for the poor. Now the machines work for them and the rich alike. For less labor the poor have more, a great improvement on old conditions when the poor went barefooted and half clad. Now shoes and stockings are waiting for the humblest lad.

The primal curse of labor and drudgery never began to be lifted before invented machinery was produced for the benefit of mankind. And with what labor, what care and what anxious thought all this has been brought forth. The history of very many of the inventions now in common use, and which have become almost necessities, would, if written, seem as strange as fiction. In one of the musty Patent Office reports issued by Commissioner Holt is the story of the invention of hard rubber. Goodyear had labored for years, he had spent every dollar which he possessed and all the money of those who had faith in the idea, but even that was exhausted. His family were reduced to want: the potatoes in his little garden were dug half grown to satisfy the cravings of hunger of himself and his wife and children. One day he stood with the soft ball of India rubber, mixed with sulphur, and overcome by a rush of despair, he flung the ball into the open fire-place, and as he watched it simmering on the coals, the impulse of his changing mood led him to rescue it. The heat had accomplished the work and he stood holding in his hands the achievement of his life-time; there only remained to be ascertained by easy experiment the amount of heat which was required. The same out-line of painful effort, disappointment, failure and ultimate success, might be told of hundreds of others, and there have been thousands who have labored and suffered in the same cause without achieving success, other than that of laying the foundation for those who should come after them with better fortune.

Yet in the face of all this beneficence, felt in every home, on every farm and in every shop, as universal as the air, due solely to the patent system, there have been, and are now, enemies of the system amongst the very people who have been benefited. A desire to get something for nothing, manifested in clamors for the adoption of wild financial schemes, is manifested against the patent system. I noticed only a few days ago one of a long series of these attacks. Mr. Morgan introduced a bill into the Senate, which, while ostensibly attacking trusts and monopolies, is really a blow at the patent system. Among other things it provides:

"No injunction shall hereafter be granted in any suit in equity brought to restrain the infringement of any patent for an invention, when it shall appear that the patent sued upon is owned or controlled by or used in aid of any combination in the form of a trust or otherwise, or of any conspiracy in restraint of trade or commerce among the several states, or with foreign nations, or when it shall appear that such suit is brought by or in aid of or at the expense of such combination."

This bill is aimed especially at one particular kind of property, viz: that created by the inventor and vested in him, or his legal representatives by force of law. The trust or monopoly holds every kind of property and could obtain an injunction, or other legal process, to restrain any trespasser from unlawfully appropriating or damaging such property; but this particular kind of property was singled out and struck at.

My venerable friend held my attention unabated, as he had grown eloquent which I had never witnessed in his sedate and matter-of-fact demeanor before, and I observed that he appeared to be a little out of breath, and I apprehended that I might have occupied too much of his valuable time, so I bowed myself out with thanks, and with my notes went from there to the Patent Office.

I found there one thing which interested me very much—a schedule of the number of patents and designs, classified by states. I noted in this that 2,122 patents were issued in 1892 to residents of Massachusetts and only 49 to South Carolina; 3,907 to citizens of New York and 3 to Wyoming Territory; that in Connecticut one patent was received in every 1,018 people; in Mississippi one to 20,000; in California one to 1,900; in North Carolina one to 21,000; in Utah Territory one to 8,000; in Illinois one to 1,900.

It struck me (and I had never thought of it before) that where education was most general amongst the masses, inventors were the most numerous.

This matter of invention is no haphazard affair. It is the work of trained minds—the most beautiful bloom and the finest fruit of the best culture. Men educated and mentally trained have worked most intelligently and with the best effect in the production of new ideas embodied in material forms, exactly as in the production of new ideas in purely intellectual and moral fields. And in the material forms they have been no less co-workers with the Divine Will than moral and religious reformers. For these inventors have co-operated to make the earth more habitable and more productive, the conditions of life more favorable and life itself more manly and freer and more desirable. Doubtless the improved conditions brought about by the relief from drudgery afforded by improved machinery have reacted and also promoted increase of education.

When, therefore, we consider all the blessings of mankind which have been produced by the inventor, and which are due to our patent system, we should be confirmed in the resolution to do all we can to maintain that system and to give the inventor all the reward that belongs to him. We are reminded of our indebtedness to him almost every day of our lives. When we step into a Pullman car, fitted with every convenience for comfort and pleasure and safety, and are whirled rapidly through a vast territory dotted with manufactories, green with forests, yellow with golden grain, or alive with mining enterprises, we see the result of the inventor's efforts. We see the same upon the decks of the ferry-boats and in the great steamships, in electric motors, driving machinery or impelling cars, and in solving the problem of street and interurban transportation; and while displacing the clumsy and slow old stage coach, with its drivers and horses, and furnishing a quicker and more comfortable transportation, at the same time it furnished employment for men and horses in other fields, thus saving labor and bettering its results without diminishing employment. We shall see at every step the inconsistency of any political effort to create a feeling between labor on the one hand and capital and the inventor on the other. We shall see and appreciate the merits of the inventor when we note the transportation of the great crops of the West—swiftly and economically carried from field to market.

Most notably we shall see this benefit in the South, and it is profitable to call attention further to the benefits which the South has received at the hands of the inventor.

By the introduction of Whitney's cotton gin, the production of cotton rose in eight years from 130,000 pounds to 18,000,000 pounds, and in 1859 it reached 2,441,000,000 pounds. The invention of Whitney was of incalculable benefit to the South in particular, and generally to the world. It is in use today substantially as he invented it. It benefitted others, but not himself.

Whatever we wear reminds us of the inventor. The fly shuttles and spinning machines of Hargreaves and Arkwright made possible the great factories of the North and East. Our gratitude should be stirred, if we properly reflect, whenever we read the daily paper, made possible in its present cheapness and enormous extent by the Webb Perfecting Press, due mainly to Mr. Hoe. We are reminded of our debt to the inventor when we telegraph to distant cities, or speak through the telephone—in fact, every day, and almost every hour of our lives.

This great obligation, due to those who have labored and freely risked their capital, may be discharged by up-holding the system which has produced all this; by defending it against attack; by explaining its merits and by giving due tribute of praise to those whose achievements have illustrated it.

The history of our country gives high place to the statesman and soldier, to those who have participated in its legislation and conquests, whose oratory or prowess have given them prestige during their day and generation. They are perpetuated in bronze and marble and are the heroes whose examples are set as worthy of imitation. But can their achievements in any wise compare with those of the inventor and manufacturer, who have furnished to the whole world arts and sciences, which have benefited and improved mankind, have given a new impetus to civilization—have changed the rude hut of the aboriginal to the comfortable home of the prosperous citizen, have set their sails on all waters, and exchanged the goods of every clime, have thrown up, as if by magic, from fields and prairies, great

cities, and furnished bread, education and protection to their occupants?

The day is not far distant when the world will gladly seek to do justice to such eminent pioneers in discovery as Bell, Edison and Gatling of our own membership, and will decorate them with the laurels of victory and gratitude, and foremost in asking for this will be the champions of business.

Pleased With the "Inventive Age."

UGHT TO BE PROSPEROUS.

CHICAGO, ILL., April 17.—We have received a copy of the "AGE," which we have read with great interest. It is a good paper and doing good work. It ought to be very prosperous.

Yours truly,
BARNHART BRO. & SPINDLER.

FIVE FOR ONE.

SPRINGFIELD, MASS., April 18.—"I am more than pleased with your magazine. It gives five dollars worth for one dollar every year."

Respectfully, etc.,
J. NEWCOMER.

AN EXCELLENT EXPLANATION.

NEW BEDFORD, CONN., April 19.—"Have had the pleasure of reading instructive article on Modern Type Composition, contained in the current number of the INVENTIVE AGE. You deserve credit for your excellent explanation on the subject."

Very Respectfully,
JOSHUA ADDY.

WHY IT IS RECOMMENDED.

BALTIMORE, MD., April 12.—"Your paper to hand. I think the paper a good one, and it should be well patronized by the public. I recommend it. First: It reaches out and gives good thoughts to its readers. Secondly: It is instructive to the young. It is composed of good sensible reading and nothing else."

Yours truly,
T. W. J. GILLIAM.

NOT TOO TECHNICAL.

HARTFORD, CONN., April 3.—"I like your magazine very much. It is not too scientific and technical for the average reader, and young mechanics appreciate it. I like those articles of Prof. Lewis."

Yours, etc.,
JOHNSON NEVINS.

A THOROUGH ARTICLE.

NEW YORK, April 20.—"Your April issue was certainly a very creditable publication. The exhaustive article on Linotype Composing Machines was very complete, impartial, and timely."

Yours truly,
PHIL. T. DODGE,
President Mergenthaler Linotype Co.

AN EXCELLENT ARTICLE.

BOSTON, MASS., April 19.—"The leading article on modern type composition in your April issue has been read and commented on freely by the craft as well as machinists, and is conceded to be the best and most comprehensive that has appeared in print."

Yours truly,
PERCY B. S. THAYER,
Boston Herald.

EXCELLENT ALL AROUND.

FARGO, N. DAKOTA, April 18.—"I am in receipt of the April number of the INVENTIVE AGE. The paper is excellent in contents and appearance."

Yours Truly,
S. S. LYON.

The April number of the INVENTIVE AGE contains the most exhaustive and profusely illustrated article on type-composing machines ever published. It answers, in an explanatory way, every question the publisher and printer would likely ask regarding type-composing machines.—*New York World*.

That Defective Armor Plate.

The defective armor-plates shipped by the Carnegie Company to the national government have been the cause of considerable gossip, and the usual newspaper cataract of mud and abuse. Conjecture has had the usual free use of printers' ink, and animosity has had a delightful opportunity to prejudice public opinion. Facts have been manufactured like bottles, to be on sale to-day, and broken to-morrow. Truth, like the traditional needle in a stack of timothy, has been hard to find, and until this is located, all prejudging and conjecture is simply on par with guessing the number of peas in a pod. To any fair-minded man it is not reasonable to suppose that the Carnegie Company would connive at tricking the government and jeopardize their reputation and business by a few defective plates. This would be selling Esau's birthright for less than a mess of pottage. That a trick has been played on the company for purposes of revenge is possible, yet not fair to assume without evidence. It may rather turn out to be an instance of oversight or carelessness. Investigation will probably remove the skin from the sore. It is, however, by no means complimentary to the manners of the times that even a national reputation is no protection against scandal mongers, ringsters, conspirators or even such small fry as the political or commercial sucker.—*Age of Steel*.

Push for Business.

It is certainly true, says *Iron and Trade Review*, that the manufacturers who have pushed hardest for business in the months of depression are the ones who have had most to do. On the other hand, those who have made little effort to get orders, on the assumption that "nobody has any money to buy anything with anyhow," as we have heard some lackadaisical people put it, have been taken at their word. If it is true in any line of activity that "all things come to him who waits," the aphorism has no truthful foundation in the world of business.

Article IV of International Convention of 1883

By EXAMINER F. A. SEELY, U. S. Patent Office.

[Conclusion of paper read before Patent Congress at Chicago.]

II.

The provision that any one who has filed an application for patent in one country of the union shall by virtue of such application enjoy a period of priority in all the other countries arouses at once an inquiry as to the nature and effect of the proposed priority. A mere prior date of application means next to nothing in this country. Elsewhere it means much. Under systems which regard the first applicant as the inventor it means everything; and, since the convention was framed for such systems, it follows that the intent was to give the right to a patent in all the union to him who has first made an application in one country, provided he presents applications in the others within the period named. It was to preserve rights which but for the convention were forfeited by compliance with the laws of the country where application was first made.

Let it not be forgotten that this forfeiture of right is by no means the result of the application for patent: it results from the publicity given to the invention by law after application, which, being the universal practice in Europe, led to confusion of the application with the publication. The invention lost its novelty when once given to the public, and therefore became unpatentable in one country as soon as made public in another, though this was not done by the act of the inventor but by the operation of law. The convention was framed exclusively in view of such conditions. It was the intention to give the inventor a certain period for filing his foreign applications after taking the step in his own country that would vitiate such application, and the period was fixed to run from the deposit of the application, which was the inventor's own act, and the date of which was clearly given, instead of from publication, which follows application, is not his act, but of the government, and whose date is not so definitely fixed. Some trouble was saved by this determination, and it makes little difference in fact to the inventor where the two dates do not widely differ. But, in fixing this date for the commencement of the period of priority, the principle was lost sight of that it is the publication of the invention that invalidates a subsequent application abroad, and not the deposit of the application. So long as the public has not acquired knowledge of the invention, the inventor's rights are not impaired, whether his written specification lie in his own desk or in the secret archives of a government bureau, as has long been known to American inventors who have applied for patents abroad while their domestic applications were pending, before international conventions were thought of.

The literal tenor of article IV is therefore in the direction of abridging the rights of American inventors. It enlarges the rights of the inventors of other countries within each other's territory, but the American, trying to secure advantage from it elsewhere, finds himself cut off from the privilege that without this provision is open to him. It is not to be concluded that he would be better off if no such convention existed, since he may always ignore its existence, and file his application in other lands just as if it had never been framed. To Americans its benefits are altogether illusory, and by becoming a party to it our government has helped to ensnare many a confiding inventor.

Equally illusory are these benefits to the foreigner seeking protection in the United States. The seven months allowed him from his first application within which he may file an application in this country is no privilege compared with the practically indefinite period he already enjoys under the law, since neither an application abroad, nor publication abroad, nor public use abroad, nor an existing patent abroad, can bar the grant of a patent to the true inventor. The applicant who does not make it appear that in his own belief that he is the inventor, is forever barred by that fact. But nothing can bar an inventor but public use of the invention in this country two years prior to his application, or an expired pat-

ent in a foreign country. Compared with this broad liberality the privilege of filing a valid application for seven months from his application at home is scarcely worth considering.

But Article IV gives the alien patentee not only the privilege of making a valid application during a fixed period, but with it a privilege of priority. In other words it gives him a quasi date of application the same as the date of application at home. Since under our law the date of invention is held to be that of reduction to practice in this country, the date of filing the American application by a foreigner is now held to be his date of invention; but this provision of the convention is to enable him to carry his date back six or seven months prior to the disclosure of the invention in the United States. This is of no consequence except in the case of an interference, when in an active art a matter of a few months or even days may be of great importance; but the provision is not consonant with our law, and cannot be made so without a radical amendment.

And so, while the spirit of Article IV, and of the whole convention, is clearly one of beneficence to the inventor, the full results of its beneficence are not yet attainable. In losing sight of the object prominent at the outset, to prevent a patent being vitiated in one country by reason of prior publication in another, and in framing the convention so as to minimize the fact of publication and exaggerate the fact of application, its value for Americans was practically nullified, and a new principle introduced at variance with its beneficent purpose. Fortunately Americans can ignore it, can proceed as if it did not exist; but, if they are led into attempting to avail themselves of its provisions, they are forced to the concession that their rights abroad are vitiated by a circumstance which has never had that effect under any system of patent law.

But with all of its beneficent purpose, the convention makes another mistake, in that it offers no safeguard to the inventor except on the hypothesis that he is the first to present an application. The favors of Article IV are all for the first applicant, no questions being asked as to how the invention came into his possession. The inventor in England may be giving the last finishing touches to his machine, intending next week to file his application for a patent for the complete invention, when he learns that his neighbor, to whom he has unguardedly exhibited it, has deposited an application for it in France or Germany, and so secured the legal title to that which he has acquired only by robbery. But, by the provisions of Article IV, the inventor has by this means not only lost his right in the country in which the application has been filed but in all the states of the international union, who are bound to respect the rights of the first applicant in any of them. Whether such conditions have occurred cannot now be asserted, but the terms of the convention are adapted to promote them, and to foster the very injustice to the inventor that the convention was designed to prevent.

With this view it is impossible to graft the provisions of Article IV upon the U. S. Patent law, except subject to the requirement of an oath of invention by the applicant, and to a provision for determining priority of invention by interference proceedings. Under the European system of taking the inventor's property, and giving him no recovery after the public has once acquired knowledge of it, the most rigid safe guards should surround the grant of a patent to insure the benefit of it to the true inventor; otherwise protection to him is nothing but a delusion; and in this respect the convention of 1883 is wholly lacking.

The convention was framed in 1880 and signed by plenipotentiaries of the different countries in 1883. Sent to the Senate for its action, it met with disapproval, on the advice of the Commissioner of Patents, under whose direction, at the request of the Senate, it was carefully reviewed. But it was not withdrawn by the President, and remained before the Senate till 1887, when it was again taken up and, on the recommendation of the Committee on Foreign Affairs, its ratification advised. The reasons for this change of opinion in the Senate are not in the possession of

the public, but it is supposed to be due to the provision of Article V, by which a hard and illiberal feature of the French Patent Law is materially modified to the advantage of foreigners having French patents.

It may also be assumed that the Senate, in advising ratification, kept in view the provision of Article II, that the citizens of one state were to have in another only the rights accorded by the laws of the latter to its own citizens, and that, as asserted in Great Britain in respect to trade marks, the subsequent stipulations of the convention were to be interpreted subject to the provision, as in Article XI they are made subordinate to the enactment of needful laws and regulations for their enforcement.

In one respect Article IV commands unqualified approval. Although it provides no safe guard for the protection of the inventor against piracy by anyone who may succeed in robbing him of his invention before he files his application for patent, nevertheless it has in contemplation the simultaneous protection of the first inventor in all the countries of the international union. Criticise and condemn as we may its methods and many of its minor stipulations, we cannot refuse the highest praise to its primary purpose. In this view the convention is a great step towards the elimination of National boundaries in the protection of inventors, and towards the creation of one vast commonwealth of which all the citizens shall be those who contribute by their inventions to the advance of industrial arts. These are the world's best benefactors; and may God speed the day when their efforts shall be intelligently seconded by rulers and statesmen, and the production of their genius protected alike in all nations, since all alike reap the benefit of them.

Therefore, if the foregoing criticism upon the convention and upon the diplomatic proceedings that led to the accession of the United States shall seem harsh to anyone, the writer hopes he will not be regarded as unfriendly to the convention. His views regarding it are fully known to those who are entrusted with the management of the international bureau, who, though differing with him by reason of their regarding the subject from a European point of view, have recognized them as friendly and not hostile. Earnestly desiring the success of the project and the enjoyment by Americans of all the benefits it proposes to confer, he sees the impossibility of this consummation until the convention shall be modified so as to recognize the special features of American law. That the conference at Brussels in 1894 may take the same view he earnestly hopes. There are signs that point that way; but to secure any result those who shall be selected to represent the United States in that conference must be backed by an intelligent, well-defined, and clearly expressed public opinion in support of their propositions. Such public opinion if it exists has never made itself manifest; and to this day there is no more evidence of public interest in the international union than there was in 1880, when the invitations were issued to the first conference. If this Patent and Trade Mark Congress, held in connection with the great Exposition which reveals so emphatically the advantages of the American Patent system, shall lead to the formation and expression of such public opinion, it may be counted among its most important achievements.

The New Battle Ships.

The naval stability board has completed and submitted to the Secretary of the Navy its report upon the stability of the battle-ships Indiana, Massachusetts and Oregon. Practical heeling or inclining tests were made to ascertain the behavior of the vessels under all possible conditions of load. The result is highly gratifying to the department, for it justifies in all respects the designs of the vessels, and shows that they are superior to any warships afloat of corresponding size. The calculations of the bureau of construction when the designs of the vessels were completed showed that they were to have, with 400 tons of coal aboard and all weights, a total estimated weight of 10,093 tons. The actual weight or displacement was 10,162 tons, a variation of only two-thirds of one per cent. The designed draught was 24 feet; the experiments show that it is actually from 23 feet 11 inches to 24 feet. The excess buoyancy was to be 195 tons; it was actually 126 tons. The metacentric height was to be 3 feet 5½ inches; it was 3 feet 4½ inches.

In addition to their great work entitled "The Book of the Fair," The Bancroft Company will soon publish the *Resources and Development of Mexico*, written by Hubert Howe Bancroft at the personal request of President Diaz, who issued a commission to gather fresh material from every quarter of the republic and aid Mr. Bancroft in every way in the prosecution of the work.

The Use of Alternating Currents of Electricity.

Recently much has been said about the use of alternating currents, which are rapidly replacing direct currents on nearly all applications of electricity. The study of the phenomena of alternating currents is not easy, owing not only to imperfect experimental knowledge of the subject, but also to the intricate mathematical operations required in applying what we do know to the best advantage. Some idea of the principles of the subject may be given in simple language, however, and may be of interest to the general reader, who is constantly coming across such expressions as "polyphase" and "synchronous" motors, and "step up" and "step down" transformers.

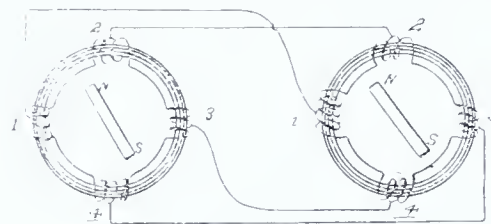
The earth, as we know from its effect on a compass needle, is an immense magnet, and in our latitude the direction of the magnetic force is northward, with a downward dip of about 70 degrees. If we connect a coil of wire of many turns with a sensitive galvanometer, place the coil vertically with its plane east and west, and suddenly turn it half way around about a vertical axis, the galvanometer needle will give a kick. If we then give it another half turn forward to its original position, there will be another kick in the opposite direction. As the coil turns around the amount of magnetic force passing through it changes, becoming nothing when the plane of the coil is north and south, and then increasing in amount but with reversed direction with respect to the coil (which produces the same effect as if it diminished while passing through in the original direction). During the second half turn, the changes take place in the reverse order, and produce a current in the opposite direction. Technically speaking, the coil is said to cut "lines of force," and we express the intensity of the force by the number of lines. We must remember, however, that these lines have no physical existence, but are merely directions in space corresponding to the direction in which a compass needle would point. Faraday discovered the fact that when a conducting material cuts across lines of force an electric current is produced in it—why no one knows. He called the phenomenon electro-magnetic induction. The coil just described, known in laboratories as an earth inductor, is the simplest form of alternating current dynamo. Its effects are intensified if the magnetic field of the earth is replaced by that of powerful iron pole pieces, kept magnetized by a current flowing around them. By the addition of a commutator, the alternating currents may be made to flow in the same direction in the external circuit, and generally also pass around the field magnets and keep them magnetized. If left as an alternating current machine, during each revolution of the coil, which we may now call an armature, the current is twice reversed in direction, thus sending out waves of electricity in the outer circuit. The time occupied by a double reversal is called the period of alternation. If a large number of alternations per second are required, instead of turning the armature at a dangerous rate of speed, the desired effect is accomplished by placing around the armature a number of pole pieces, so that we get an alternation as a coil of the armature passes through the field due to each pole piece. By the dynamo we transform mechanical energy into electrical energy, of course without possibility of gain of power, and always with some loss. If the current flows through another machine exactly like the first, the armature will be driven round by the repulsion between the current flowing through it and its field magnets, and we have a motor, which restores us our mechanical energy minus that lost in heating the wires and mechanical losses, such as friction. Any ordinary motor will run by an alternating as well as by a direct current, but there is more waste of power from heating and other causes. Besides, an ordinary motor is not self starting when run by an alternating current. For such reasons alternating currents have until recently been little used for power, though they do well enough for lighting.

But there are very great advantages attending the use of alternating currents, the chief one being economy of transmission over long distances due to

the smaller wires that can be used under certain conditions. The power of a current is proportional to the current strength multiplied by the electromotive force, or difference of potential between the terminals. These terms correspond to pressure in speaking of flow of water. The power may be written $E C T$, where E is the electromotive force, C the current and T the time during which it flows. If we double E we can get the same power from half the current, and so can use much smaller wires without danger of heating. But a difficulty arises here. It is hard to make a dynamo which will give a potential of 2000 or more volts without burning out, while it would be desirable in many cases to use 20,000 volts. This excludes the use of direct current machines, but alternating currents can be transformed to as high a potential as we please. If one coil of wire is placed inside or alongside of another and an alternating current passed through it, an alternating current will be induced in the second, just as in an ordinary induction coil. If there are 100 turns in the first and 1000 turns in the second, the electromotive force in the second will be ten times that in the first; if there are only 10 turns in the second, the electromotive force will be one-tenth that of the first, but the current will be one-tenth, nearly, in the first case and ten times in the second—not quite, for there is some loss of energy by heating. Such an instrument is called a transformer. A current may by such means be generated at 500 volts, transformed by a "step-up" transformer to 20,000 volts, transmitted over a long wire, and brought down by a "step down" transformer to 110 volts, say, for distribution.

Being now able to secure as high voltages as may be desired, it became necessary to find some means of using the alternating currents advantageously for power. As said before, an ordinary direct current motor will run by an alternating current, but it must be started up, until it gets in step or "in phase" with the dynamo furnishing the current. Opposite each pole is a "dead point," and if the alternating current passes in the wrong direction when the armature coil is near such a point it stops the motor instead of pushing it on—just as you would stop a pendulum by hitting it in the wrong direction in the middle of its swing. To keep the pendulum moving you must hit it when it is in the proper "phase" of its swing and at regular intervals equal to its period of vibration. If a motor is brought up to the right speed, even if not quite in phase it will soon catch step and move "synchronously" with the dynamo, but a sudden change of load may throw it out of phase and stop it. Another trouble is due to the fact that we have practically an oscillating magnetic field, and there is jarring and jolting and waste of energy very much like what we would find in trying to use an oscillating fly wheel.

We need something that moves smoothly and uniformly like a rotating fly wheel. A number of men have found how this may be done, but most credit for practical realization is probably due to Nikola Tesla, the brilliant young Servian, now a citizen of



this country. In the motor devised by him there is no connection whatever between the current which magnetizes the field pieces and that in the armature, which is simply a set of closed coils, and is pulled around by a rotating magnetic field very much as an orange would be swung around in a whirlpool. A dynamo may be made with a stationary armature and a rotating field magnet, and for simplicity (as the principle is the same in both cases), the diagram shows this type.

Let the first figure represent a dynamo, the second a precisely similar motor. On each there are four coils on the stationary armature rings at equal distances apart, the corresponding ones of the two machines being connected; but in practice one of

the wires may be replaced by an earth circuit. As the north pole of the dynamo magnet moves past coil No. 1, it induces a current in it, which, passing through No. 1 of the motor, acts as a magnet and attracts the north pole of the magnet. A similar effect is going on at coils No. 3, with reference to the south poles. As the magnet sweeps past coil No. 1 and approaches No. 2, the current dies down in the first and increases in the second, so that the magnet in the motor is constantly being pulled forward by a newly made magnetic pole in front of it, while that it has just passed loses its effect. In other words we have a "rotating magnetic field," which drags the movable magnet around with it. The currents in the four coils at any given instant have a "phase difference" of one-fourth a period, that is, the maximum in one coil lags behind that just before it by one-fourth the period of an alternation. Similarly there may be three phase and two phase motors, and this type is known in general as a polyphase motor.

There are some disadvantages about a polyphase motor. One is that so many connecting wires are required. Another defect common to all alternating current machines is that when the alternations are rapid the current is only "skin deep," and heats up the wires more, requiring larger ones. Another is that a three phase dynamo cannot run a two phase machine. On the other hand they are self starting, have a steadily rotating field, and have no commutator and brushes, being therefore perfectly free from sparking. In principle they are like transformers with one coil movable. In practice the armature of the motor is not a magnet, as shown in the diagram but a closed coil of wire, the induced currents causing the same effect. Any conducting body in a rotating magnetic field will be whirled around.

It was shown at the electrical convention lately held in Washington that the difficulty in regard to having a separate dynamo for each type of motor can be overcome by a combination of transformers, so that a current of any number of phases may be transformed into a current of any other number or even a direct current. The polyphase system has been adopted at Niagara, a low number of alternations, 25 per second, being used to diminish heating effects and other losses. If the Niagara plant proves to be the success that is expected, alternating currents will undoubtedly soon come into general use.

E. P. LEWIS.

Aluminum for Lithographic Printing.

Experiments have recently been made with a view to introducing aluminum to take the place of Bavarian stones for lithographing. The porosity and peculiar absorbing and retaining qualities of the aluminum are greatly in its favor. Its advantages over the stone, however, and that which renders it so much more desirable, is its greater lightness, for while a printed sheet of aluminum having a surface of 30x40 inches and the fortieth of an inch in thickness weighs only three pounds, a stone of the same dimensions weighs at least 400 pounds. As the metal is now selling in rolled sheets at \$1 per pound, and a stone of good quality and of weight stated is worth \$2, the difference in the price is quite marked. In consequence of the increasing demands of the lithographic trade the supply of the best quality of stone is rapidly becoming exhausted, while aluminum, which is obtained from clay, and which is on that account the most abundant metal on the earth, is practically inexhaustible. As an illustration of the contrast presented by the two materials it may be stated that one ton of aluminum sheets will do the work now performed by the 200 tons of stone. It may be further stated that while the capital invested in this large supply of lithographic stone is about \$60,000, the price of the one ton of aluminum sheets which would be required for the same work would be about \$2,000, exclusive of the cost of preparing the metal and the necessary printing blocks, which would not exceed \$2,000 more. The specimens of printing done on the aluminum sheets is such that they can be employed in the finer kinds of bond printing and commercial as well as color work. There is one particular in which the metal is decidedly superior to the stone in its flexibility, which renders it especially available for cylinder press printing, by which a two-fold or three-fold speed may be obtained in the printing process.

Fast Newspaper Printing.

Probably in no other branch of mechanical industry has there been such remarkable progress during the last decade as in the manufacture of fast machinery for printing newspapers. To the unsophisticated the lightning rapidity with which the large metropolitan dailies are turned out seems almost incredible.

The cut published in this issue gives a fair idea of one of these remarkable machines; in fact, the fastest that has been built up to the present time. It prints upon both sides of three continuous webs of paper, supplied from three separate rolls, and delivers the papers folded, pasted and even counted in bundles at the enormous rate of 96,000 four or six page papers per hour; 72,000 eight page papers per hour; 48,000 ten or twelve page papers per hour; 36,000 sixteen page papers per hour, and 24,000 fourteen, twenty, or twenty-four page papers per hour. The paper, of course, passes through the machine much quicker than the eye can follow. It would certainly be a great revelation to any of the old time printers could they but see the stream of complete newspapers pouring from one of these machines—just think, 1,600 a minute! One of these large machines has been in constant operation at the office of the New York Herald for the past two years, and sometimes of a Saturday evening, when printing their enormous Sunday edition, this press turns out as many as 480,000 perfect eight page papers. It certainly takes a flight of fancy to imagine such a splendidly printed paper as the New York Herald coming from so simple a piece of machinery with this lightning rapidity. The accuracy and precision with which everything is done almost make the onlookers believe the machine endowed with animation. In fact, it is more than animated, for no living creature could take the paper from the roll with such marvellous rapidity and all without a break; the paste being applied at the proper place, every fold made where it should be, and the papers cut off from the web with geometrical exactness.

This monster machine (which is called the Sextuple) contains over 16,000 separate pieces and was built by Messrs. R. Hoe & Co., the celebrated press manufacturers of New York, who have always been the acknowledged leaders in their line.

At the special request of the United States Patent Office authorities a complete model, on a small scale, was made of this press and placed in the center of the United States Patent Office exhibit at the World's Fair; and considering the ingeniousness of construction, the quality of workmanship, and the results accomplished by the machine, was regarded by them as perhaps the most remarkable piece of mechanism produced in this century.

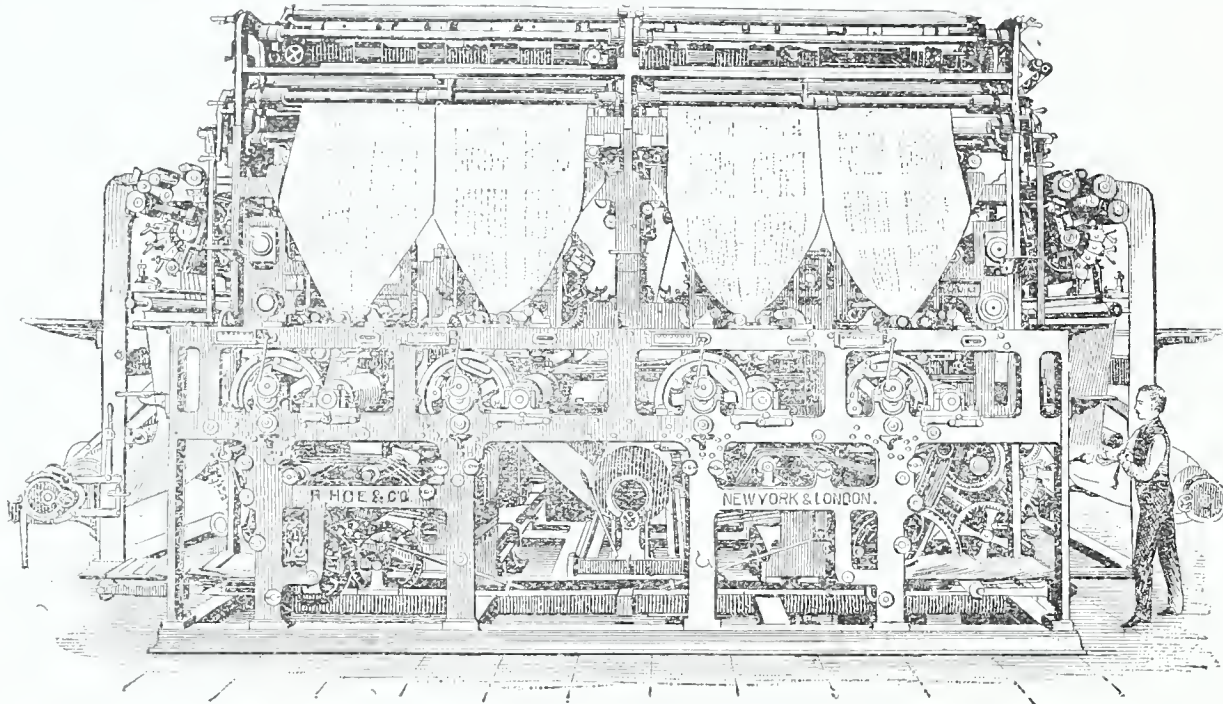
Those who visited Machinery Hall at the World's Fair will of course remember the Quadruple presses on which a small edition of the Chicago Daily News was run off. It is on this style of machine that nearly all the prominent dailies throughout this country are printed, as well as those of Great Britain and Ireland, and even in Australia and New Zealand these improved presses can be found working.

Wonderful as are these newspaper machines, it is said Messrs. Hoe & Co. have just finished at their factory in New York presses for some of the prominent illustrated weekly periodicals even more astonishing in their production, the papers coming from the machine stapled together in book form of almost any desired number of pages, and with a colored cover attached. Of these, however, space per-

mits of but mention, for it would take many pages to do justice to such triumphs of mechanical genius.

An Improved Hay Carrier.

At the Columbian Exposition in Chicago, last year, inventions relating to hay carriers and haying tools cut quite a figure. Among the exhibits was noticed the display of Mr. J. E. Porter & Co., of Ottawa, Ill.; and now in the list of patents for April 24, 1894, his name appears, a patent having been granted to him on a two part clasp suspension hook and a hay carrier carriage adapted for running on either straight or curved tracks. The

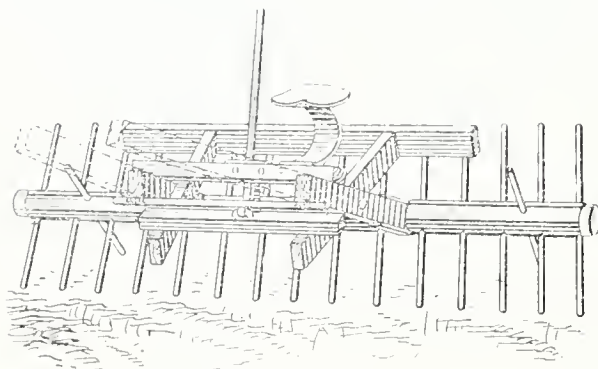


THE HOE SEXTUPLE PRINTING PRESS.

claims in the patent are, first, for a novel hook made in two parts for clasp and suspending the track from the rafter beam of a barn or other structure, and second, a hay carrier with swivelling mechanism for running on straight and curved tracks. Mr. Porter is an ingenious inventor, and has taken out numerous patents on hay carriers and their connections. His leading inventions in hay carriers are, a rail having an upper bead for attaching accommodating suspension hooks, and also, a rail having an upper bead for suspension hooks, intermediate horizontal flanges for the wheels of the carrier to run upon, and a lower bead for an adjustable knocker block to be clamped to. Mr. Porter's company largely manufactures various kinds of haying implements, and stands prominent among those of the west engaged in the same business. Recently, a man speaking of Mr. Porter said, "I have known Mr. Porter for twenty-five years and never saw him a day when he was not working at something." To show the value of his inventions last year his company made a contract with a firm in the far west for the manufacture of several thousand of his carriers per annum for a term of five years, which proves that real inventors are rewarded for the exercise of their genius. Mr. Porter secured his later patents through the patent law and soliciting firm of Mason, Fenwick & Lawrence, of Washington, D. C.

The Fiscus Stock Rake.

Mr. Adam Fiscus, of Fiscus, Iowa, has invented a stock rake which for simplicity, inexpensiveness and durability commends itself to farmers. The rake is 12 feet wide and constructed with a view of being attached to the rear of a farm wagon, the same being



uncoupled, using the hind wheels only with a tongue attached. The inventor claims the object of the invention is to provide a stock rake which commends itself for its simplicity, effectiveness, ease of operation, lack of liability to get out of repair and cheap to manufacture. It is claimed that any boy capable of driving a team can operate it, as all that is necessary is to jerk the lock lever off the notch releas-

ing same of its engagement when the rake is loaded. Beyond this the rake is self-operating. The cut herewith does not show the rake attached to the hind wheels of a wagon for the reason that this would hide the rake to a certain extent and the scheme of attaching will be readily understood. Mr. Fiscus hopes to dispose of an interest in this invention on its merits, and will more fully describe his invention to those interested.

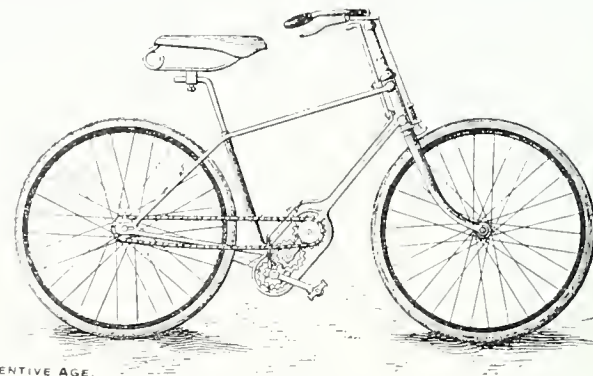
What Seigniorage Means.

Seigniorage means the difference between the cost of a mass of bullion and the face value of the piece coined from it. The purchasing clause of the Sherman act called for the purchase by the government of 4,500,000 ounces of silver bullion each month at the current or market price. This was paid for by the government in special treasury notes. As the price of the bullion fluctuates the volume of these notes was never the same any month, although the amount of bullion purchased each month was practically the same. From July, 1890, until the repeal of the silver purchasing act, something less than \$154,000,000 of these special treasury notes were issued, and the great mass of silver bought therewith now lies in the government vaults. The bullion would coin 209,000,000 of our present standard silver dollars, which contain each 371.25 grains of pure silver. The bullion value of our silver dollar averaged 81 cents during 1890; 76 cents in 1891; 67 cents in 1892, and run down to about 60 cents in 1893, and has averaged less than this during the first four months of 1894. At the present market price of silver bullion the \$154,000,000 treasury notes issued to buy bullion in 1890-91-92-93 would purchase enough to coin about 300,000,000 standard silver dollars. The bullion on hand will coin \$55,000,000 standard silver dollars in excess of \$154,000,000 treasury notes issued to purchase it. The act authorizing the purchase of this bullion gave the Secretary of the Treasury power to coin it, and the notes issued for its payment were made redeemable in either gold or silver. Running at full capacity it would take the government mints several years to coin all this bullion into dollars. The Bland bill, which passed Congress and was vetoed by the President, intended to expand the circulating paper currency represented by this mass of silver from the outstanding issue of Treasury notes to an amount \$55,000,000 greater, by treating the whole of it as if it were a deposit of coined silver dollars, for each of which a corresponding paper dollar should be sent out.

Watkins' Bicycle Gearing.

Mr. Lee Watkins, of Colorado City, Colorado, has succeeded in producing the ingenious gearing, shown in the accompanying illustration, for quickly increasing and diminishing speed. Gears of graduated sizes are so arranged in connection with a hand lever that they can readily be thrown in and out of engagement by the rider without his having to dismount.

On approaching a hill the rider can operate the hand lever, and throw the small gear on the drive-shaft into mesh with a



larger intermediate gear which in turn imparts power to a gear on the sprocket shaft and increases the power at the expense of speed. When level ground is reached the power gear can be thrown out and the speed gear applied.

The details of the construction can readily be learned by procuring a copy of the patent granted Mr. Watkins, March 13, 1894, No. 516,287.

The Baltimore & Ohio Cut-Off.

The new route of the B. & O. Railway through Harper's Ferry necessitated improvements to the extent of \$250,000. Two miles of double track, a tunnel 875 feet in length under Maryland Heights and an iron bridge of nine spans, over 1,000 feet in length, over the Potomac river were built. The old route and the old bridge have been abandoned.

PATENT DECISIONS.

Recent Decisions of the Commissioner of Patents and U. S. Courts.

MORGAN ENVELOPE COMPANY *vs.* ALBANY PERFORATED WRAPPING PAPER COMPANY.

The Supreme Court, in *Morgan Envelope Co. vs. Albany Perforated Wrapping Paper Co.*, reported in the *Official Gazette*, vol. 67, page 271, declared to be invalid patent No. 325,410 granted to O. H. Hicks, for improvements in packages of toilet paper, and with the decision, gave a very interesting and important discussion of several patent law points. They restated or affirmed the rule that where the applicant has acquiesced in the rejection of his claim, he is thereby estopped, where a patentee, to claim the benefit of the cancelled claim or such a construction of the patent as would be an equivalent thereto.

They also decided, and in so doing seem to have established a precedent, that it is immaterial whether the cancelled claim is broader or narrower than the patented claim. In the Hicks patent the above case existed; the applicant having erased a broad claim and substituted in its stead a narrow one, and he then attempted to construe the latter claim so as to embrace the subject of the first.

A second point announced in this case, was that a patentee having a claim for a combination in which an article which perishes in its use was an element, could not regard as an infringer, a purchaser who, after using the first supply of the article, replaced it by a new supply. This rule of patent law is not new with the case in question and is only qualified by the fact that a separate patent for the perishable article will, of course, prevent such an action, for reasons well known.

An exceedingly interesting and important point, and one which, it is regretted, did not receive positive adjudication, was touched upon in this case and left unanswered, even by *obiter dicta*. That is, the question whether when a machine is designed to manufacture, distribute, or serve out to users a certain article, the article so dealt with can be said to be a part of the combination of which the machine itself is another part. This point, is one which arises daily and is of great importance.

It would seem that the article with which the machine dealt should be regarded more as the thing upon which the machine was used; that work which the machine was designed to perform, and surely, supposing such a condition, the article could not then be regarded as an element of the combination. It is with a great deal of interest that attorneys and others will look forward to an authoritative determination of this point, as it is one of the most important questions with which an attorney has to deal in the prosecution of his profession.

JOHNSON STREET STEEL RAIL COMPANY *vs.* WM. WHARTON, JR., & COMPANY, LIMITED, *et al.*

The Supreme Court in the *Johnson Street Steel Rail Co. vs. William Wharton, Jr., & Co., et al.*, vol. 62, of the *Official Gazette*, page 274, decided that the doctrine of *res judicata* is not affected by the fact that the prior judgment was not reviewable by a court of appellate jurisdiction. This seems to be the first time that the question has received direct judicial notice, and made the subject of an authoritative decision. In the case above the prior decision was, on account of the small amount involved, not appealable to the Supreme Court, while in the second case such an appeal was possible.

It seems a hardship that the appellants should be deprived of the right to appeal to the Supreme Court, but this hardship, if one it is, is attributable to the rule which prevents appeals to the Supreme Court unless the amount involved aggregates a specific sum, since it was this rule which prevented the appellants from appealing to the Supreme Court in the first instance.

DUNLAP *et al.* *vs.* SCHOFIELD *et al.*

In *Dunlap et al. vs. Schofield et al.*, published in vol. 67 *O. G.* page 137, the Supreme Court construed the U. S. Statute No. 4500, and there held that it was the duty of the plaintiff in a suit to prove that he gave the defendant due notice of his patent, either by stamping the word "patented" on the article, or by giving him special notice. The statute referred to provides, in substance, that no person manufacturing or dealing in patented articles can recover damages for the infringement of the article unless he stamps the word "patented" thereon, or unless he gives notice of another form and to the same effect. This statute has received numerous judicious constructions and its scope is clearly defined.

MASSETH *vs.* JOHNSON *et al.*

The U. S. Circuit Court for the Western District of Pennsylvania decided in *Massetth vs. Johnson et al.*, vol. 67, *O. G.* page 143, that the use of an infringing device is not justified by the fact that the defendant had previously attempted to use one made under the plaintiff's patent and which proved useless. While we do not know of any other case in which this particular question arose and was decided; we think that it may be safely regarded as a notorious principle of patent law, since the rules of infringement are as clear and unequivocal as possible, and there can be no doubt but what all use of a patented article is an in-

fringement of the patent, unless the use be an authorized one.

It was also decided in this case, that of *Massetth vs. Johnson et al.*, that failure of a patentee to manufacture his device does not defeat the rights vested in him by the patent. This rule is well established and has received adjudication in many other cases.

Another case in which *Massetth* was the complainant, and entitled *Massetth vs. Reiber*, vol. 67, *O. G.* page 143, was the means of deciding that the refusal of a patentee to furnish his device to a person when requested does not justify the use of an infringing device. This, like the failure to manufacture, is a well established principle of patent law, and is founded upon the fact that the grant of a patent confers upon the patentee the exclusive right to the invention and this he may enjoy by allowing the invention to lie in oblivion during the entire life of the patent just as well as he can enjoy it by placing the invention on the market.

RICHARDSON *et al.* *vs.* SHEPARD *et al.*

In *Richardson et al. vs. Shepard et al.*, vol. 67, *O. G.* page 144, the patent under which the De Long hook and eye is manufactured received judicial construction, and was declared to be valid. This decision emanated from the U. S. Circuit Court for the district of Massachusetts, and the court took that opportunity to re-affirm the doctrine that commercial utility and popularity should be of great weight, indeed should be conclusive, in determining the validity of a patent where other tests are not available. This rule has been established by a long train of decisions, and is founded on the supposition that the product on of a device which has been a public desideratum is necessarily attended by the use of the inventive faculties, since, if it were otherwise the desired end would have been obtained by the baser or more common faculties, namely, mechanical skill. In the case under consideration the differences between the patented article and prior devices were very slight, and it was maintained by the defendants that these differences did not arise to the dignity of inventions. It was well established, however, that the invention is of great commercial utility, and that its introduction was instantly followed by almost universal adoption, and on the strength of these facts the case was held to be within the domain of the above stated rule.

SEABURY *et al.* *vs.* AM ENDE.

In *Seabury et al. vs. Am Ende* published in vol. 67, *O. G.* page 401, the Supreme Court, in upholding the patent No. 181,024 granted to Chas. G. Am Ende, re-announced several well established and important principles of patent law. It was there that the doctrine that specifications are addressed to persons skilled in the art again received judicial sanction. This rule has its origin in that statute of the U. S. which provides for the writing of specifications, and there it is required that the specification be written in such full, clear and exact terms that any person skilled in the art to which the invention appertains can make and use the same. The leading case on this point is that of the *Webster Loom Co. vs. Higgins*, reported in vol. 21, *O. G.* page 2031, and there the Supreme Court announced the construction, above referred to, and established a precedent which has been, and always will be, accepted as the law.

It would be quite unreasonable, in fact impossible, to require that an inventor word his specification in a way which would enable all persons to make and use the invention from the information there given, since there are certain stages of development in every art with which every invention of that class must be connected, as the several links of a chain, and before the invention can be understood these stages of development must be familiar to the person considering the invention.

Now it is obvious that to enable persons unacquainted in the art to understand the invention, these stages of development must be explained before the invention can be understood, and since extrinsic information would not be permissible the specification would be the place where this preliminary explanation must be given, this would make the specification almost endless; and therefore the impracticability of the system. On the other hand, artisans in the several arts, knowing these developments as their profession requires, will be able to pass from the prior to the new device with merely a description of the new device *per se*. In the case referred to, *Seabury vs. Am Ende*, it was also decided that where the infringer fails to show that the salary of the president of the infringing company was actually paid no allowance will be made for it in the profits. This rule has also been previously judicially stated, and probably had its origin in the case *Rubber Co. vs. Goodyear* reported in 9 Wall, 804.

RICHTER *vs.* REYNOLDS *et al.*

In *Richter vs. Reynolds et al.*, vol. 67 *O. G.* page 404, the U. S. Court of Appeals, Third Circuit, decided several points of Trade Mark Law, which are both important and interesting. In this case a German manufacturer claimed to have an exclusive right in this country, to a trade mark protected by registration in Germany and based his contention on the treaty of 1871, between this country and Germany, which treaty provides with regards to Labels and Trade Marks, that citizens of Germany shall enjoy, in the United States, the same protection as native citizens. The court held, however, that this does not give to a citi-

zen of Germany, who has acquired a right to a trade mark in that country, a similar right to the trade mark in the United States.

It was also decided, in this case, that an occasional sale in this country by a foreign manufacturer, to a limited extent upon special orders, and to supply particular customers, will not amount to such a use as to show an intention of adopting the symbol placed on such preparations as a trade mark.

Quite an important point of patent practice was decided by the Assistant Commissioner of Patents in *Morley vs. Pfannkuche*, an interference case in the Patent Office. Pfannkuche had a patent while Morley based his rights on an application, and the former contended that he should be allowed to examine Morley's application before filing his preliminary statement, and this on the ground that he was handicapped by Morley, since Morley knew the status of his invention and he (Pfannkuche) was entirely ignorant as to the status of his opponent. This contention was upheld by the Assistant Commissioner, who ruled that where there were no substantial difference between the two inventions, there could be no impropriety in allowing Pfannkuche to examine the application of Morley before the filing of the preliminary statements.

In the Assistant Commissioner's decision in *ex parte Kinney*, it was held that no valid objection could be made to an applicant's statement in the specification of an object which he knew had been accomplished by others before him, because this could be the case and if the applicant's means for attaining this object were novel, the invention was patentable. The opinion has been entertained by many that the proper practice was not in accordance with the ruling, and it is well that the question has received an authoritative answer, as it will clear a doubt which has at some time, existed in the mind of almost every patent lawyer.

COMMISSIONER SEYMOUR in *ex parte Zuber*, 67 *O. G.* page 529, gave authority to what has always been regarded as the proper practice, but which has not, to the best of our information, ever been authoritatively stated. The question is that of the proper action of an Examiner where the applicant presents an amendment seeking to incorporate new matter in an application. If the amendment be refused acceptance the only relief of the applicant will be a petition to the Commissioner on a point of practice, while if the amendment be accepted and the subject matter thereof rejected, an appeal will lie to the Examiners in Chief, and thence to the Commissioner in the regular way. Following this, it was generally the practice, in justice to the applicant, to enter the amendment, since then he would have the benefit of two appellate reviews and would be insured justice. However, this practice was sometimes departed from, and the amendment refused entry in the record. It is now settled, by *ex parte Zuber*, that this cannot be done, and that the true and correct practice is, (quoting from the syllabus of the decision), "that the amendment should be entered and rejected on the ground of new matter, and for all other reasons which bar the patentability of its subject matter."

In a suit brought by The Edison Electric Light Co. et al. *vs.* The Buckeye Electric Light Co. et al. The U. S. Circuit Court for the Southern District of Ohio, Eastern Division, applied to one of the Edison patents some principles of general law, which, perhaps, were not relished by the former company. During the pendency of the application upon which the patent was based, several foreign patents were applied for and granted for the same invention, and, owing to the priority of the United States application, the fact did not appear in the patent of that country or in the Patent Office records. However, because of some misunderstanding of law, the Edison people applied to the Patent Office for an entry of the existence of the patents in the Patent Office records and on the face of the patent, and for a consequent limitation of the patent. The then Commissioner, Benjamin Butterworth, granted this request and prepared a notice of correction for attachment to the official document. Ten years later The Edison Company arrived at the conclusion that the law did not require such a limitation, and applied for a retraction or cancellation of Commissioner Butterworth's supposed correction, which cancellation was granted by Commissioner Simonds. During the force of the supposed limitation The Buckeye Company, supposing the patent to be truly limited, invested considerable money in the manufacture of the lamp covered by the patent, and were sued by The Edison Company for infringement, the suit resulting in the granting of an injunction in favor of the latter.

Subsequently The Buckeye Company asked for a dissolution of the injunction, and the Court held, in the decision on such petition, that The Buckeye Company had a right to be guided by the showings on the face of the patent, and that The Edison Company was estopped from suppressing their operations, on the ground that they had led the public to believe that they had abandoned the invention after the expiration of the foreign patent, and could not, at this late day, retreat from their position. This principle had its origin in a general law case, *Insurance Co. vs. Mowry*, 96 U. S. 546, and is to the effect that one is estopped from cancelling a representation as to the future only when adverse rights have accrued owing to the influence of the declaration. Accordingly the injunction was dissolved. The case is reported at length in vol. 67 *O. G.* page 529.

NEWS CONDENSED.

MARCH 30.—Speaker Crisp declined the appointment of U. S. Senator from Gov. Northern.....In a tilt in the House Ex-Speaker Reed was forced to sit down by Speaker Crisp.....Two thousand wiremen go on a strike in New York.....Two constables and two citizens were killed in Darlington, S. C. in a dispute over the State liquor dispensary law.....Col. Breckenridge recites the tragic story of his life, and, while admitting his intimacy, denies that he ever offered to marry Miss Pollard.....The body of Kossuth reached Buda Pesth amid great demonstration.

MARCH 31.—General Frye's "commonweal" army reached Little Rock, Ark., on a freight train. Coxey's army entered Pennsylvania.....Property at Tampico, Mexico, valued at \$250,000 was destroyed by fire.

APRIL 1.—The whiskey war in Darlington, S. C., necessitated the ordering out of state troops.....Striking potters at East Liverpool, Ohio, assaulted a number of persons.....Prince Bismarck celebrated his seventy-ninth birthday.....With imposing ceremonies Kossuth was buried in Buda Pesth.....Prof. Wm. Robertson Smith, librarian of the University of Cambridge died.

APRIL 2.—Governor Northern of Georgia, appointed Patrick Walsh to succeed Senator Colquitt in the U. S. Senate.....Darlington, S. C., was declared under martial law.....Republicans make great gains in elections in Ohio, Michigan, Iowa, Connecticut and Montana.....Mr. Voorhees opened the debate on the tariff bill in the Senate.....One-half of the plants in the coke region, Pennsylvania, are idle on account of the strike.

APRIL 3.—Governor Tillman proclaims military authority in all towns and cities in South Carolina.....The strike in the coke regions is spreading.....In Chicago, 3,000 painters were locked out by employers to offset the strike.

APRIL 4.—A stay of execution in the case of Pendegrast, the murderer of Mayor Harrison, until July 2nd, was granted.....In the riot in the Pennsylvania coke regions, six persons were killed.....Returns from town elections in Illinois, Ohio, Michigan, Nebraska, Kansas and other western states, and Rhode Island, show heavy Republican gains.....Another bomb thrower in Paris, causes the injury of several persons.....Over a thousand houses in Shanghai were burned.

APRIL 5.—The Coxey army arrived at Homestead, Pa.....The Ohio State Convention of Mine Workers, decided in favor of a general strike May 1st, unless the old scale of wages is restored.....James Kennedy was nominated for Governor by the Prohibition Convention of Oregon.....The Massachusetts Senate killed the Woman's Suffrage Municipal Election bill by a vote of 23 to 13.....The Iowa Legislature passed a bill giving women a right to vote for school officers.....The order of Judge Dundy reducing wages on the Union Pacific Railroad was revoked by Judge Caldwell.....The civil status in Florence and Darlington counties, S. C., was restored by Gov. Tillman's proclamation.....The National Medical Congress closed its session in Rome, to meet next in Russia.

APRIL 6.—Admiral Walker sailed from San Francisco for Honolulu.....The President signed the Behring Sea Bill.....The examination of witnesses in the Breckenridge-Pollard case at Washington was concluded.....General Master Workman Sovereign of the Knights of Labor predicts that the Coxey movement will end in failure or flight.....In the House of Commons the Rosebury government was defeated on a private bill by a vote of 228 to 227.....Pondoland, in South Africa, has been peacefully annexed to the British possessions.....The death of M. Jablochkoff, the Russian electrician, and inventor of the electric candle, is announced.

APRIL 7.—Benjamin King, poet and humorist, was found dead at Bowling Green, Ky.....A premature explosion of giant powder at Brinton, Pa., killed three laborers and injured several others.....Ten persons were killed and several injured by an explosion in a fire works factory in Petersburg, Va.

APRIL 8.—At a mass meeting of the Pennsylvania coke strikers, it was determined to compel cessation of work at various plants.

APRIL 9.—W. W. Rockhill, of Maryland, was nominated by the President to be Third Assistant Secretary of State in place of Edward Strobel, nominated for Minister to Ecuador.....The final decision of the Chilian Claims Commission was rendered in Washington.....Eight firemen were killed and eight others badly injured in the Davidson theater fire at Milwaukee.....A blizzard raged on the North Atlantic coast.....Ex-U. S. Senator, Alexander Cottell, of New Jersey, died at Jamestown, N. Y.Walter Wellman and his Arctic expedition arrived at Bergen, Norway.

APRIL 10.—President Cleveland issued his proclamation, warning persons violating the Seal Fisheries Act.....H. B. Burham, Judge Advocate General, United States Army, retired, died in Virginia.....Bernard Manion's livery and boarding stable in Baltimore, burned with 130 horses and 150 carriages; loss \$400,000.....It was decided by the Miners' District Convention at Scottdale, Pa., to continue the strike.....The Republicans make sweeping victories in the charter elections in New Jersey.....The regular Democratic organization in the election at Albany, N. Y., was defeated by Republicans and Hill Democrats.

APRIL 11.—One of the worst blizzards of the season raged along the Atlantic coast from Maine to New Jersey.....A general strike was ordered for April 21st, by the United Workmen's Convention at Columbus, Ohio, which will throw something like 300,000 men out of employment.....The Holland election resulted in the defeat of the government.

APRIL 12.—Champion Corbett sailed for Europe.....The American Glucose works at Buffalo burned; loss \$1,200,000.....The bill making treating in barrooms a misdemeanor was defeated in the Massachusetts House by a vote of 43 to 95.....The city of Rio-Grande-Do-Sul has not been captured by Brazilian insurgents, as reported.....The Behring Sea bill passed the second reading in the House of Lords.

APRIL 13.—David Dudley Field, the eminent jurist, died in New York, aged 89 years.....Coxey's army entered Maryland.....A general strike on the Great Northern Railway was ordered by the American Railway Union.....The American colony at Bluefields has sent an ultimatum to the Nicaraguan authorities, demanding a provisional government.

APRIL 14.—In the Pollard-Breckenridge case the jury awarded a verdict of \$15,000 for the plaintiff.....Senator Z. B. Vance of North Carolina, died at Washington, of apoplexy.....General Henry W. Stocum, Ex-Congressman, died at Brooklyn.....Congressman Jerry Simpson was taken seriously ill at Washington.

APRIL 15.—Coxey's army reached Cumberland, Md.....No trains are running on the Great Northern Railway from the Red River to Spokane.....The United States Cruiser, San Francisco, arrived at Bluefields.....The report of Mello's surrender is denied.

APRIL 16.—The Supreme Court of Colorado decided in favor of Gov. Waite in the controversy with the fire and police boards of Denver.....Admiral Irwin was retired for age, and Commodore Skerrett succeeds him.....James M. Harvey, Ex-Governor and Ex-U. S. Senator of Kansas, died at Junction City.....The House of Lords passed the Behring Sea bill.

APRIL 17.—Henry S. Ives, the New York financier, died of consumption near Asheville, N. C.....General Cliver Lathrop Shepherd, U. S. A., retired, died in New York, aged 81 years.....Ernest Knabe, the famous piano manufacturer, died in Baltimore.....Coxey proceeded in canal boats from Cumber-

land, Md.....The Samoset Club of Omaha, adopted resolutions denouncing Senator Hill as a traitor, and similar resolutions were passed by a Democratic mass meeting in San Francisco.....A number of Brazilian insurgents and their forces, surrendered at Buenos Ayres, President Peixoto having declared personal amnesty to all the rank and file except the leaders.

APRIL 18.—Mark Twain's Publishing Co., New York, assigned.....The City Electric Power Co.'s plant at Sacramento, Cal., burned; loss \$100,000.....The Logan Iron and Steel works at Burnham burned; loss \$150,000.....In the Polish labor riot at Detroit, the sheriff was fatally wounded and two rioters killed.....Judge Sanborn of the United States Court at Fargo, N. D., issued an injunction restricting the Great Northern Railway strikers from interfering with the management of the trains.

APRIL 19.—Ex-Gov. Thos. J. Jarvis, was appointed U. S. Senator from North Carolina, to succeed Senator Vance, deceased.....The State Liquor Dispensary law declared unconstitutional by the Supreme Court of South Carolina.....Admiral Mello at Buenos Ayres obtained asylum, declaring that he would give up for lack of resources.....With great pomp, Princes Victoria Melita, of Saxe-Coburg-Gotha and Grand Duke Ernest Lewis of Hesse, grandchildren of Queen Victoria were married.

APRIL 20.—The linseed oil works of the National Linseed Oil Co., of St. Louis, burned; loss \$400,000.....Kelly's industrial army at Omaha seized a train of forty box cars.....A large delegation of the Workmen's Protective League arrived in Washington, to protest against the Tariff Bill.....The betrothal is announced of the Grand Duke Nicholas, heir apparent to the throne of Russia, to the Princess Alix of Russia.

APRIL 21.—Ex-Gov. James W. Throckmorton, of Texas, died at McKinney.....Albert B. Monroe, member of the United States board of Indian Commissioners, died at Tarrytown.....Gov. Tillman ordered the South Carolina dispensaries closed.....The great coal strike has begun.....Many people were killed and injured by an earthquake in Greece.

APRIL 22.—Walter Bragg, son of the late Interstate Commerce Commissioner was killed in a duel by Dr. J. H. Nafel.....Earthquakes in Greece caused great loss of life.....The steamer Los Angeles of the Pacific Coast Steamship line went ashore at Point Sur. Two persons are supposed to have been drowned.....Smallpox is raging in Chicago.

APRIL 23.—Wings of the Coxey army are announced from Baltimore, Md., North Attleboro, Mass., Terre Haute, Ind., Seattle, Washington, Oakland, Cal., Evans, Colo., Chicago, Ill., Grand Rapids, Mich., Portland, Oregon, Butte, Mont., and Neola, Iowa.....Jesse B. Seligman, the New York banker, died in San Diego, Cal.....Royal assent was announced to the Behring Sea bill in the House of Commons.....Agents of Coxey's army arrived in Washington to arrange matters.

APRIL 24.—Coxey's army arrived at Frederick.....Coxeyites to the number of 500 steal a Northern Pacific freight train at Butte and start eastward at the rate of forty miles an hour.....Judge Caldwell issues an order to the United States Marshal of Minnesota to seize the train, should it be brought into his district, and restore it to the receivers of the road.....Frank Hatton, editor of the Washington Post, was stricken with a slight touch of paralysis.

APRIL 25.—Democratic senators predict the passage of the tariff bill by June 1.....In a fight with the Coxeyites from Butte, Montana, the United States Marshal's posse was defeated. Two deputies and one rioter were shot.....Mary Gilman, a young girl at Cincinnati, was shot dead on the street by Father Dominic O'Grady, a Catholic priest, who was infatuated with her.....The fourth annual convention of Confederate veterans opened at Birmingham, Alabama.....In Terre Haute, Ind., Gen. Frye's commonweal army captured a train of box cars.....Gen. Robert Granger, U. S. A., retired, died at his home in Washington.

APRIL 26.—Gen. Coxey, at Hagerstown, Md., expressed his disappointment at the appearance of so few reinforcements.....Hogan's army of Coxeyites, over 400, who captured the Northern Pacific train at Butte, were overhauled by the government troops at Forsyth, Mont. About 100 fled to the mountains. It is thought the leaders only, will be held.....The Republicans of Indiana completed a state ticket by nominating J. L. Monks for judge of the Supreme Court. W. D. Owen heads the ticket for Secretary of State.....The Ohio legislature defeated the town and precinct local option bill.....Nathaniel S. Berry, war Governor of New Hampshire, died at Bristol.

APRIL 27.—In the stock market sugar reached 103.....The anniversary of the birth of Gen. U. S. Grant was celebrated in Pittsburg, New York, Boston, Philadelphia and other cities.....Another earthquake in Greece causes the destruction of thousands of houses and many lives.....The Coxey army arrived at Gaithersburg, Md., 320 in line.....Jim Robinson and Ben White, colored, convicted of attempted rape, were hung at Manassas, Va.....The Odd Fellows were not allowed to parade on the Capitol grounds....."Citizen" George Francis Train, who lectured in Washington without a license, was arraigned in police court and discharged; he left at once for New York, declaring the Coxey movement a lizze.

APRIL 28.—Two hundred special police were added to the Washington police force in anticipation of the arrival of crooks with Coxey's army.....A band of 300 Coxeyites in Oregon steal another railroad train and troops are ordered out to arrest the outlaws.....A mass meeting of unemployed workmen in Pittsburg passed resolutions denouncing Congress.....The motion for a new trial of Congressman Breckenridge was denied.

APRIL 29.—General Coxey and his 300 followers arrived at Brightwood Driving Park, adjoining Washington. They were met by thousands of wheelmen and curiosity seekers.....Winchester, Va., had a \$100,000 fire.....General Frye's industrial army at Indianapolis decided to walk to Washington if railroads refuse to carry them.....The North Dakota state democratic committee passed resolutions rebuking Congress.....The strike on the Great Northern railway is still on and only a few mail trains are running. Troops were sent out from Fort Snelling to quell the disturbances at several division headquarters.

APRIL 30.—Frank Hatton, editor of the Washington Post, died.....President McBride of the United Miners, declared that 160,000 men are now on a strike.....Coxey declares he will speak from the steps of the Capitol if he goes to jail for it.....Senator Stockbridge, of Michigan, died suddenly in Chicago.....A 10 per cent dividend was declared to the World's Fair stockholders.....Sugar stocks jumped up to 107 in New York.....The fifth week of the tariff debate in the Senate was begun, Mr. Turpie making a savage attack on Mr. Aldrich.

BOOKS AND MAGAZINES.

The *Trade Press* is the name of a new monthly, published in the interest of the trade and class journals of America. Henry J. Bohn is editor.

The Smithsonian Report for 1891, which has just been issued, contains a translation by William Hallock from the German of an address delivered before the Royal Bavarian Academy of Sciences by Eugene Lommel on "The Scientific Work of George Simon Ohm." (Washington, D. C.)

When finally completed, "The Book of the Fair," now being published in monthly parts of forty pages each, will be the most complete and magnificently illustrated history of the World's Fair published. The work is of the highest standard typog-

graphically and the high reputation of the publishers, the Bancroft Company, Chicago and San Francisco, is a guaranty of thoroughness and completeness of the text.

A little volume, containing the names and addresses of the attorneys practicing before the United States Patent Office, carefully compiled by Virginia W. Middleton, the well known Patent Office stenographer, has just been issued. The list is classified by states and the volume will be found a very handy reference book. The nominal price of \$1 for paper cover and \$1.50 for cloth binding, places the work in the reach of all interested.

The agitation of the Nicaragua canal question is becoming general throughout the United States and the urgency of Congressional action and governmental control is admitted on all sides. In advocacy of the scheme *Review of Reviews* for April says: "The United States can have no disposition to wish Great Britain ill in her maintenance of Gibraltar and Malta, her control of Egypt, her firm possession of the Suez canal, and the maintenance at all hazards of her unobstructed route to India and Australia. The United States can look on with indifference, if not rather with positive approval, as Great Britain proceeds to appropriate large and ever larger areas of South Africa. Nor do we object to the constant widening of British jurisdiction in Asia by the invasion from India of adjacent provinces. But this country cannot view with any satisfaction the disposition of Great Britain from her original limited foothold at the mouth of the Essequibo river to push forward the frontiers of British Guiana by appropriating territory that belongs to Venezuela. We shall naturally give all the benefit of the doubt to the self-governing republic that is on the ground, rather than to the British Empire that ought not to hold sovereignty over a foot of South American soil."

Users of electric lights and motors will find much to interest them in an article contributed to the May number of Cassier's Magazine, by C. E. Kennelly, telling how electricity is measured. Of the large number of electric meters which have been devised and tried only a limited number have come into extended use, and of these Mr. Kennelly has selected several, explaining how they are constructed and how they operate, and helping, in no small measure, to make clear to consumers of electricity how the basis of charges for their use of the subtle fluid is arrived at.

The *Electrical Review*, New York, has improved its typographical appearance by a new dress of type.

Transportation for May contains an exhaustive article on the proposed electric double track railway between New York and Philadelphia, accompanied by a map, showing the route and connections. The projectors of this line are Messrs. Joseph H. Reall and Frank A. Magowan, of New Jersey. The plan is not only to construct a through line of electric railway to connect the principal points in the State of New Jersey with each other, and with New York and Philadelphia, but to consolidate the local lines in different places into one system. The company just organized has the right to increase the capital stock to \$10,000,000. This sum, it is figured, will build the entire system of roads laid out, embracing 150 miles of line, and secure the local roads referred to, while it is shown that ten per cent will be earned on the capitalization from the beginning.

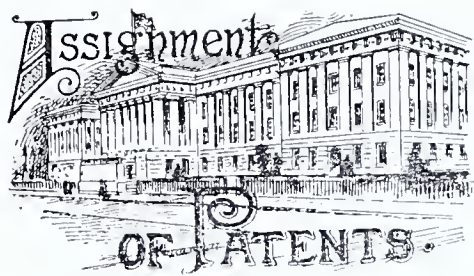
Gen. Fitzhugh Lee, formerly Governor of Virginia, is busily engaged in preparing a biography of his uncle, Gen. Robert E. Lee. The manuscript is nearly completed, and the book is expected to be published in May. It will be the first authentic story of Gen. Lee's life which has yet been printed.

THE DIGEST OF TRADE MARKS, by Wallace A. Bartlett, is one of the best works of the kind thus far issued from the American press. It is correct, and comprehensive. Patents are no longer issued for small improvements in machinery manufacturing and the like, and they can only be protected now-a-days by Trade Mark laws. When a dealer adopts a particular device to distinguish his wares, he is just as safe from an infringement of his rights concerning his wares in question, as if they had been patented, provided the trade mark is original and utterly unlike any other. Mr. Bartlett has been at great pains in giving the law and practice in the United States on the subject of Trade Marks for machines, metals, jewelry and the hardware and allied trades. He has compressed a vast store of information into a handy manual of 176 pages, has thereby saved inventors the task of sifting out this knowledge for themselves from hundreds of sources, which might be difficult for them to reach. The volume is handsomely printed, illustrated and bound, and is an honor to the typographic excellence achieved by its publishers, Gibson Bros., Washington, D. C.

A novel and extremely useful publication has made its appearance in New York—*Peck's Export Purchase Index*. It is of particular interest to those engaged in export trade, giving a classified list of American manufacturers whose products are suitable for export. The publication is to be issued every six weeks in alternate English and Spanish editions, under the direction and management of Mr. W. J. Davis.

Received from Chairman Hammer, of the Special Committee, an advance copy of the National Electric Light Association's Standard Rules for Electrical Construction and Operation, revised and adopted at the 17th convention recently held in Washington. The new rules are supplemented by the report of the Special Committee on the rating of arc lamps. Mr. Hammer is confident that there is nothing today in the nature of sets of rules for electric construction and operation which can compare with these rules.

Since the alleged discovery, by Orville W. Owen, M. D., of "Sir Francis Bacon's Cipher Story," we have heard very little from Col. Ignatius Donnelly and his elaborate work on the same subject. In this work, which is being published in three volumes by the Howard Publishing Company, of Detroit, Mich., it is demonstrated that Mr. Owen at least possesses patience and genius. His story is entertaining and attests great study and research on the part of the author. The first volume closes with the death of Queen Elizabeth. Volume two, now ready, describes the relations existing between Elizabeth and Robt. Dudley, afterwards Earl of Leicester; the murder of Dudley's wife to get her out of the way and his secret marriage to Elizabeth. In reviewing the second volume the *Detroit Journal* says: "This part of the cipher story—the Spanish Armada—is really the most important that has yet been given to the public by the decipherer, and by its literary construction, magnitude and historical correctness will go far in itself towards convincing the doubters that Dr. Owen has really discovered a hidden story and that he is not cleverly patching up a tale in blank verse from the several works to delude that part of the world that has taken interest in the question of who wrote the Shakespeare plays."



Under this heading is published all assignments of patents or partial interest in same, as on record in the United States Patent Office for the month ending April 28, where the consideration was \$2,000 and over.

Elijah Avery inventor, to the Souvenir Novelty Co., of Denver, Colo., Mustache Guards; all rights. \$15,000.

John C. Armstrong inventor, to Grant H. Stafford and S. C. Horton, of Charles City, Ia., Step Ladder, Ironing and Bread Board; all rights for nine counties in Minnesota, and the States of North and South Dakota. \$2,000.

Erastus W. Appelman inventor, to R. P. Berry of Clearmont, Iowa, Platform Balconies for Railway Cars; an undivided half interest. \$5,000.

Shubael T. Armstrong inventor, to Fred A. Cole of Plymouth, Mich., Smoke Consuming Furnace; one undivided tenth of all right. \$10,000.

E. W. Allen inventor, to C. W. Van Aikin, assignor, to the Eclipse Mfg Co., of Canton, Ohio, Washing Machine; all rights for twenty-three counties in Ohio. \$3,000.

Phillip Birch inventor, to J. F. Yohn, Knife Concaver and Hone; an undivided half interest \$7,500.

Wm. Blackburn inventor, to the Blackburn Boiler Compound Co., of Ohio, Compound for Preventing Incrustation in Boilers; all rights and benefits in said invention. \$2,000.

Chas. E. Buell inventor, Chas. J. Kintener, assignor, to the Johnson Sub-Trolley Co., of N. Y. City, Means for Storing and Utilizing Electricity on Vehicles; all rights. \$2,000.

James F. Bartlett inventor, to Wm. Boldenweck of Chicago, Ill., Combination Umbrella Holder and Stand; all rights. \$2,000.

Samuel H. Boylan inventor, to the Boylan Voucher Account Co., of Chicago, Ill., Account Keeping Apparatus; all rights. \$50,000.

Claude Bennett inventor, to Frank Chapman of Newberry, Mich., Combination Milk Pail; all rights. \$15,000.

Henry Broadwell inventor, to Wm. J. Hamilton of Stillwater, Oklahoma, Washing Machine; all rights for twenty-five states. \$5,000.

Wm. A. Butler inventor, to John G. Boyd of N. Y. City, Electric Railways; all rights. \$5,000.

Walfried Burkman inventor, to the Fox Island Clay Works, of Tacoma, Wash., Clay Reducers; all rights for three states. \$15,000.

Cyrus Crabbs inventor, the National Fence Co., assignor, to T. H. Sykes and others, Fence; all rights in twenty-seven counties in W. Va. \$2,500.

Walter R. Close inventor, to Geo. Wheelright of Bangor, Maine, Derrick; an undivided half interest. \$5,000.

Jno. J. Carr inventor, Leonard F. Bell, assignor, to J. R. Woodbridge of Chicago, Ill., Tool Holders for Grind Stones; all rights except for three states. \$2,000.

John W. De Atley inventor, J. C. Williams of Clay Co., Mo., Coffee or Tea Pot; entire right to use, sell and manufacture. \$9,875.

John A. Duggan inventor, to the State Street Safe Deposit and Trust Co., of Mass., Railroad Switches; all rights. \$50,000.

Samuel E. Foreman inventor, to Z. B. Shipman and T. B. Peacock of Topeka, Kans., Door Check; all rights for Indian and Oklahoma Territories. \$2,500.

Wm. H. Felthousen inventor, to the Perfection Roller Screen and Novelty Co., of Baltimore, Md., Window Screen; all rights. \$5,000.

Roderick G. Gupitli inventor, to the Pendleton Glass Tube and Pipe Works of Ind., Glass Pipe Casting; all rights. \$10,000.

Wm. A. Grant inventor, Aetna Soap Machine and Manufacturing Co., assignor, to Herbert J. and Frank A. Grant of Lake City, Utah, Process of Manufacturing Soap; all rights for seven states. \$11,000.

Wm. H. Gonne inventor, to Thos. S. Sprague of Detroit, Mich., Knob Attachments; all rights. \$4,500.

Jacob M. R. Gedney inventor, to Sarah A. Kiersted of N. Y. City, Wear Irons for Vehicles; all rights. \$2,200.

John Gustafson inventor, Geo. F. Dobson, assignor, to the Universal Type Setter Co., of N. Y. City, Type-Setting Machine; all rights. \$25,000.

John H. Harris inventor, to P. Z. Alexander, Ice Cream Freezer; all rights for the state of Mississippi. \$2,000.

James E. Harder and John H. Fox inventors, to Marcellus D. Johnston of Springfield, Ohio, Device for Removing Sediment from the Bottoms of Liquid Storage Vessels; all rights for W. Va. and Pa. \$3,000.

Arthur E. Hotchkiss inventor, Walter S. French and Ellsworth H. Burtis, assignors, to Edward Moore and others, Elevated Railway; all rights for one county in N. J. \$2,500.

Geo. R. Huff and Geo. H. Vernon inventors, to Margaret G. Burton of St. Paul, Minn., Saw Filing Machine; all rights. \$2,500.

Wm. R. King inventor, J. Heron Crosman, assignor, to the Standard Brake Co., Automatic Brake; all rights. \$10,000.

Lyman L. Loomis inventor, to Henry M.

Loomis of Binghamton, N. Y., Invalid Bedstead; one undivided half. \$12,000.

Wm. B. Lawrence inventor, Frank H. Gervis and others, assignors, to the Lawrence Press Co., of Ohio; all rights. \$27,000.

Paul W. Leffler inventor, to the Leffler Electric Magnetic Railway Co., of Ill., Electric Railway; all rights. \$1,000,000.

Ellsworth D. Middlekauff inventor, to Andrew N. Aitken of San Francisco, Cal., Sickle Grinders; an undivided half interest. \$50,000.

John Mooers, inventor, to Eugene Stafford of Kellogg, Iowa, Ironing Tables; all rights. \$2,000.

Edwin L. Martin inventor, to the Locomotive Feed Water and Heater Co., of Bakersfield, Cal., Circulating Tubular Boilers; all rights. \$1,000,000.

Susan A. Mackie inventor, to the Torrent Washer Co., of Detroit, Mich., Wash Boiler; all rights. \$10,000.

Frederick W. Nall inventor, to Hugh E. Kenny and Samuel I. Slade of Detroit, Mich., Money Changers; an undivided two-thirds. \$3,000.

Chas. W. Rodecker inventor, J. W. Boggess, assignor, to C. W. Rodecker of Cherryvale, Kans., Window Screen; all rights for twenty-eight states. \$5,000.

Emmet B. Raymond inventor, Gus Srevers and others, assignors, to James E. Baker of Denver, Colo., Oil Vaporizer and Burner; all rights for the state of Colorado. \$6,000.

David A. Wesley inventor, to the Champion Roaster Co., of Butte City, Montana, Cooking Pans; all rights. \$300,000.

Henry A. Walke inventor, to H. A. Walke of Columbus, Ohio, Fountain Pens; one undivided half interest. \$2,500.

James W. Woodward inventor, to Warren Browning and B. L. Jones of Fayette Co., Ill., Ice Cream Freezer; all rights. \$5,000.

Industrial Notes.

The Lawrence, Mass., Duck Mills will reduce wages 10 to 20 per cent.

Straus & Co.'s Silk Mill is being removed from Yonkers to Paterson, N. J.

The drought in California has ruined the wheat and barley crop in many sections.

Puddlers in Sligo, (Pa.) mill are working on a co-operative profit-sharing system.

The Ellwood Tin Plate Company, at Ellwood City, Pa., will soon begin operations.

A contract for a tin plate plant to cost \$100,000 and to employ 300 hands was signed at Marion, Ind.

A revival is noted in the plate glass industry in the vicinity of Pittsburgh, equivalent to 50 per cent.

A woolen mill is about to be established at Cavalier, N. Dak., by J. O. Blickfield, of Grand Forks.

The largest ingot ever cast at Homestead, was turned out recently and weighed 175,000 pounds.

The owners of Peabody Cotton Mills, at Rahway, N. J., have restored the 10 per cent cut in wages.

The Branford Lock Works were sold at auction last month to the Yale & Towne Manufacturing Company.

The plant of Wilke's Rolling Mill Company, at Sharon, Pa., has closed down on account of business depression.

It is said that sufficient capital is now forthcoming to put the proposed Delaware and Chesapeake Ship Canal on a practical basis.

An increase of 10 per cent in wages to go into effect May 1st., has been announced by the Consolidated Steel and Wire Company, of Joliet, Ill.

The Johnson Company, Cleveland, has been incorporated with a capital of \$5,000,000. The new concern will manufacture steel, iron and coke in all forms and also engage in mining.

British metal authorities predict that aluminum will be sold this year in Europe at 45 cents a pound. They contend that it will be produced in enormous quantities and at prices which will permit many new uses.

The Logan Iron and Steel Works, near Lewiston, Pa., were almost completely destroyed by fire on April 17th. The loss is estimated at \$100,000; partially insured. About 100 men are thrown out of employment.

The Edison Electric Illuminating Company, of Philadelphia, paid so well the first three months of this year that it has declared its usual quarterly dividend of 2 per cent and an extra dividend of 1-5 per cent.

The severity of the depression in Western agricultural interests is illustrated by the condition of the steam thrasher business. Manufacturers state that their output in 1894 will hardly exceed 20 per cent of that of 1892.

After boring to a depth of 3,800 feet, the Winchester Repeating Arms Company, at New Haven, Conn., has failed to secure a sufficient artesian flow and abandoned the work. Over \$50,000 has been expended in the experiment.

The statement of the country's foreign trade for the nine months ending with March, shows that exports exceeded imports by \$223,303,885, whereas for the corresponding period of a year ago there was an adverse balance of \$9,650,000.

A recent test of the lignite coal of North Dakota by the St. Paul Board of Trade, has demonstrated its excellence and the feasibility of its use as far east as St. Paul and Minneapolis in competition with coal brought from Pennsylvania via the lakes.

Comparing British production with the output in the United States, the American output of pig iron in 1892 was 2,540,110 tons greater than that of Great Britain; during 1893 it was but 294,661 tons more. This decrease was almost entirely in the last half of the year.

The report of the *Iron Age* shows that the weekly capacity of the furnaces in blast on April 1 was 126,732 tons, an increase of 16,566 tons over March 1. This is an increase since

October 1, when the lowest point of production was reached, of 53,000 tons a week, but is 52,000 tons less than the weekly capacity of April 1, 1893.

The first armor piercing shell of 13 inch caliber yet made will shortly be tested at the naval ordnance proving grounds on the Potomac, says *Iron Age*. It is made of steel, forged by the Wheeler-Sterling process. The target will be a 17 inch nickel steel plate from the Carnegie Works, the heaviest yet made for the Government.

The Minnesota Canal Company recently organized, is said to be about ready to begin operations on the construction of a 33-mile canal forty feet wide, connecting St. Louis river with Duluth for the purpose of furnishing 200,000 horse power for the operation of mills and factories. It is estimated the work will require two years and cost \$3,000,000.

Electric Flashes.

An electric railway is to be built between Los Angeles and Pasadena, Cal.

An exhibition of electrically-driven machine tools is to be held at Buda-Pesth from May 27 to Sept. 30, 1894.

The proposition to bond the city of Grand Rapids, Mich., for an electric lighting plant has been carried by a vote of 5,022 to 2,120.

It is announced that an international exhibition of fine arts and electricity is to be held in Rome, Italy, from Sept. 20, 1895, to June 30, 1896.

The bill introduced by Mr. Catchings, in the House, contemplates the building of an elevated electric road between the cities of Washington and New York. The capital is placed at \$15,000,000.

The death is announced of the Russian inventor and electrician, Paul Jablockhoff. In 1877 he produced the now famous arc lamp, the Jablockhoff "candle," which was used to light the Avenue de l'Opera, Paris, 1878.

The entire electric plant of the Capital Gas Company, Sacramento, Cal., which holds contracts for the lighting of the city and the running of street cars, was burned on the 18th ult. The total loss is estimated of \$300,000.

The ship channel from the Gulf to the city of Mobile is soon to be lighted by electricity. The plant will be the largest so far used for a similar purpose. The channel is thirty miles long, and the alternating current system has been adopted.

The United Electric railroad of Nashville, Tenn., was sold at auction last month to Nathaniel Baxter, Jr., who represents the bondholders, for \$138,500. The purchasers assume \$150,000. The lines operated by the company aggregate forty-six miles.

The projected construction of a four-track trolley road between Philadelphia and Harrisburg, Pa., is announced. The distance between the two points is about 100 miles. A company has been formed for the purpose, that, it is said, represents large moneyed interest. The road will be built from one end to the other on private rights of way, and all grade crossings will be avoided. The roadbed is to be of the best construction, stone ballasted, and the track will be of standard gauge. A 70 pound rail will be used. There will be no grades exceeding 4 per cent. The block signal system will be used over the entire line.

Resuming Operations.

Gilbert Company's Woolen Mills at Ware and Gilbertville, Mass.; Linwood Woolen Mill, at North Adams, Mass.; Amsterdam Knitting Company, of Rockton, N. Y.; Mill Manufacturing Company, at Millville, N. J.; Hanover Woolen Mills, at Galena, Ill.; Woolen Mill, at Evansville, Ind., with 10 per cent reduction in wages; Arlington Woolen Mills, at Wilmington, Del., with 500 men; Woonsocket, R. I., Rubber Company; Langdon Ore Mines, Tecumseh, Ala.; Steel Plant, at Ashland, Ky.; Manchester Woolen Mills, near Fort Worth, Texas; Belmont Furnace of Wheeling Steel and Iron Company, Wheeling, W. Va.; Engine and Iron Works, Sioux City, Ia.; the Belmont Mill of the Wheeling Iron and Steel Company, at Wheeling, W. Va.; East Hampton, Mass., Spinning Company; all the manufacturing establishments in Woonsocket, R. I.; William Clark Company, Westerly, R. I.; Cohoes Knitting Mill, at Cohoes, N. Y.; "Famous" Knitting Mills, at Chillicothe, Ohio; Woolen Mill, at Woodland, Cal.; Mexico, Mo., Fire Brick Works; Union Rolling Mill Company, Cleveland.

Who Has Back Numbers of Inventive Age?

The INVENTIVE AGE wants the following back numbers and will be pleased to pay all expense of postage.

1889—Nos. 1, 2, 4, 6, 7, 10, 11, 12, 14, 15, 17, 22 and 24.
1890—Nos. 25, 27, 28, 29, 30, 31, 32, 33, 36, 37, 38, 40, 41, 43, 44, 45, 47, 48, and 50.
1891—Nos. 51, 52, 54, 55, 59, 64, 72, 73, 76.
1892—Nos. 67, 78, 81, 88, 94.

1893—January, May, June and July issues.

Advise us by postal in advance of what numbers you will send and we will forward stamps for mailing.

THE INVENTIVE AGE,
Washington, D. C.

SECRETARY MAYNARD, of the American Association of Inventors and Manufacturers, has sent out the first installment of the proceedings of the third annual meeting, held in Washington, in January last. Additional pages, containing the papers read at the meeting will be sent out to members of the association later. The proceedings appeared in the February number of the INVENTIVE AGE and one or more of the papers are being published each month; that of Hon. B. H. Warner, president of the Washington Board of Trade, being printed in this issue.



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A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE, which keeps inventors posted in the art in which they are mostly interested. — The full address of any patentee, and number of patent found below sent to any address on receipt of one 2-cent stamp. — We will send, postpaid, to any address, printed copies of any U. S. patents, with specifications and drawings, upon receipt of 20 cents for one copy; 35 cents for two copies; 50 cents for three copies. — (See premium offer elsewhere in this issue.) — Address THE INVENTIVE AGE, 8TH AND H STS., WASHINGTON, D. C.

LIST OF PATENTS

GRANTED FOR INVENTIONS,

MARCH 27, 1894.

(See note at head of this list.)

Acid, making concentrated nitric. H A Frasch.
Adding apparatus. K E Wiberg.
Adding machine. W K Nichols.
Adding, subtracting and recording machine. W W Hopkins.
Air brake apparatus. J B Stewart.
Air forcing apparatus. R F Evans.
Anchor box. H A Goetz.
Annealing and hardening steel rods or wire. C W Bildt.
Apparel hanger, wearing. G Buch.
Asphalt rock, machine for crushing and grinding. J H Tabler.
Awning. C Lecherer.
Axle, vehicle. J H Westinghouse.
Baby walker. N P Bradish and J H Wilson.
Bark, pocket savings. N A Shigon.
Barometer, compound tri-liquid. O H Woodworth.
Barrel filler. G R Rabbitt.
Barrel washer. F E Anderson.
Barrels to stocks, detachably securing. A Burgess.
Batteries, apparatus for supplying or removing storage. W E Worthen.
Bearing, vehicle ball. D Pettit.
Bed, combination folding. E E Murphy.
Bedstead. H Karp.
Beer, method of and apparatus for extracting air from. J Hunt.
Bell. E D Rockwell.
Bell, bicycle. R H Charles.
Bench dog. C A Wayland.
Bicycle adjusting device. J H Prince.
Bicycle speed gearing. A D Pringle.
Bicycles, &c., driving mechanism for. J M Allen and J Parker.
Blower or force pump, rotary pressure. J S Godfrey.
Boiler tubes, &c., protecting ends of. H Wigge.
Bolt cutter. M D Lachrs.
Book, check. J B Alter.
Book, duplicating check. J Oldfield.
Book support. C L Work.
Book, wall. J B Nash.
Boot or shoe stretcher. L B Cobb.
Brake actuating mechanism. T Conway.
Bread or cake box. J M Wheat.
Bubble blower. F D Horton.
Bung closure. E Hazlehurst.
Cable conveyers, &c., coupling for. M Garland.
Calculating apparatus. P Soulier.
Caliper gage. C E Billings.
Calipers. J Randu.
Calipers, micrometer. J D Sloane.
Camera tripod or support. E W Perry, Jr.
Can opener. G L Donovan.
Canceling machine, card. A A Low.
Cane fabric, device for weaving diagonal strands into. D E Warfield.
Cane, umbrella. R Waples, Jr.
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Car brake. L H Cole.
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Car brake staff ratchet. A D Gerbig.
Car buffing mechanism. H C Bihoup.
Car coupling. J D Locke.
Car coupling. C W Patton.
Car coupling, 2. A W Van Dorston.
Car draft rigging, 2. A E Mitchell.
Car, mail or express. W D Patterson.
Car safety guard, open. W H Hart.
Car sanding device. C E Holbert.
Carburetor. J W Lambert.
Carrier apparatus. J R Pollock.
Casks, pitching. L Wagner.
Casting crucible steel ingots. E Smith.
Casting machine, type. H Heimelbach.
Castings, mold for making. N D Bailey.
Centrifugal separator. C H Scharat.
Chair brace. D L Trexler.
Check book. W R Moore.
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Circuit closer. C E Allen.
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Coin receiving apparatus. C C Clawson.
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Collar and hame, horse. D K Bill.
Commode. D H Murphy. (Reissue).
Compensating, apparatus for determining, correcting, or compensating. C T E Clausen.
Conduit subterranean. F Lang.
Core box. G A Lambert.
Corn cribbing machine. L M Millen.
Corn cutting machine. M L Hydorn.
Corset stiffener. J Wolff.
Cradle. W H Meekins.
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Crate, knock down. S F Sherman.
Cuff fastener. J V Washburne.
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Cultivator. J W Norton.
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Dead centers, device for overcoming. C M Currey.
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Diamond setting. F P D'Arcy.
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Dumb waiters, electrical appliance for. J H Roberts.
Dynamite and making same. W Y Rochester and J McArthur.
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Elevator gate operating device. G C Hawkins.
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Extension key. A A Doyce.
Fan, electric ventilating. C W De Mott.
Fence machine, hand. E Warner.
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Fence, wire. S C Bowen.
Fencing wire. G C Wright.
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Lamp, carbureting gas. A Kitson.
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Lamp electrode, arc. S Heiman.
Lamp, incandescent electric. R P Ashwell and G W Tuttle.
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Lifting or hoisting tool. D Kirkbride.
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Measure, tailor's adjustable. W Veitch.
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Meat cutter. C Brueg.
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Milk inspecting apparatus. W G Spence.
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Moldings, corner piece for room. A Simon.
Map wringer and pull. A H Ramey.
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Oil burner. C A Haddridge.
Oil burner, crude. M Lynch.
Oiler for elevator guides, automatic. W J Ferguson.
Ordinance, automatically operated breech mechanism for. A Noble and C H Murray.
Oven, bake. J J Pfenniger.
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Packing case. D E Griffiths.
Paper making machine. G Lind.
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Photographic background holder. C O Johnson.
Photographic camera shutter. W L Lightford.
Photographic gallery skylight. W B and J Shaw.
Piano, zither. A Marberger.
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Pitman head. P Swenson.
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Planter, corn. B F Smith.
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Plow. J S Edge.
Plow, steam. C F Johnson.
Precious metal, ornamenting and etching. H Goodwin.
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Propeller, screw. A W Case.
Propeller, screw. F Otte.
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Pumping apparatus. W B Nevill.
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Railway, electrical. B Bidwell.
Railway flag signal, automatic. D M Bailey.
Railway rail and chair and uniting same. M M Snappes.
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Railwayrolley, electric. F S Church.
Refrigerating machine. L Block.
Registering mechanism. C P Gott.
Revolvers, swinging cylinder and trigger lock for. D B Wesson.
Ring gage. W F Doll.
Riveting machine. E Saltzkorn and L Nicolai.
Roasting coffee, cocoa, &c., apparatus for. C A Otto.
Rod mill floor. G Leiberger.
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Safe. C E Clark.
Sail for vessels. T W Ratsey.
Sand distributor. H Moorhouse.
Sash securing device. A Little.
Secondary battery. G L Ballard.
Sewing machine. D Brown.
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Sewing machine, buttonhole. W V Miller.
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Sheet metal cans, manufacturing. J Lee.
Sheet metal spinning, machinery for. F Haberman.
Sheetstackle. F Robinson.
Shelf, metallic. C W Marquardt.
Shoe nailing machine. E D Childs.
Show case. W G Irwin.
Sieve, ash. J Goldman.
Signals, electrical apparatus for controlling. M B Leonard.
Sleigh knee socket. B F Sweet.

Smoke and spark arrester. E R Jones.
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Smoke consumer. G Rhoden.
Smoke consuming furnace. S T Armstrong.
Soap pressing and stamping machine. D C Radston.
Spindle bearing. J H Northrop.
Spinning mule safety attachment. E G Varney.
Spanning spindles, device for adjusting bearings of. G O Draper.
Stair rod. A Jones.
Stamp attaching device. J G Pulling.
Stamp canceling and post marking letters, machine for. M J Dolphin.
Steam boiler. G F Nilsson.
Steam boiler, water tube. M H C Shann.
Steamer, fruit or vegetable. M Fuller.
Stool and cane camp. M R Mathewson.
Store fixture bracket. F P Palmenberg.
Straw stacker, pneumatic. J W Nethery.
Stump extractor. G B Pulley.
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Telephone switch. F R Colvin.
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Testing machine clamp. C C Miller.
Thermocenter. H Wilson.
Thermometer. E A Linder.
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Tire, pneumatic. R E Tollner and C N Potter.
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Tire, wheel. C L Ames.
Tire, wheel. C Kehr.
Tires to wheel rims, means for securing pneumatic. P Davies.
Tobacco pipe. E G Deloe.
Toggle press. W E Brock.
Tongues and grooves in ends of flooring boards, machine for forming interfitting. J F Burnham.
Tonguing and grooving ends of flooring boards, machine for. J F Burnham.
Tool holder. F A Pratt.
Torpedo launching tube. E W Lloyd and C W Hutchinson.
Transom opener. J E Anger.
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Turn table. G Rohrlach.
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Vehicle wheel. W W Valentine.
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Vise. J M Lewis.
Washboard. G B Lutomski.
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Washing machine. H R Ward.
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Windmill. W A Blank.
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Window screen and attachment. C H Bartlett, Jr.
Wire cloth holder. W Lasar.
Wire netting machine. G M Wright.
Wrench. O C Stanley.
Wrench, combination. H A Post.

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Accordion. J Galleazzi.
Acid, purifying tannic. B Reims.
Air-compressor, hydraulic. E Schutz and J H Henderson.
Air, gas, &c., receptacle or tank for the storage of compressed. W Timmis.
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Berth, Ship's. E Lawson.
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Car-coupling. B M Whitlock.
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Fence. J E Phillips.
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Fence, wire. C W Bennett and F Chapman.
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Fertilizer, making. N B Power.
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Fire extinguisher. J Van Kalker and N Bolt.
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Fish, live box for shell. T Mann.

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 Fine, safety. C E Martin.
 Fluid discharging apparatus. W T Messenger.
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 Fork cutter attachment. P P and J Dustrud.
 Fruit cutting and pitting machine. J F Rehm.
 Fruit gatherer. J K Woodward.
 Furnace. E B Cox.
 Furnace. E B Cox.
 Furnace. F H Richards.
 Furnace, fine fuel. C Wegener.
 Game apparatus. W G Barns.
 Game apparatus. C C Clawson.
 Garment and gusset therefor, bifurcated. S B and F F Lewis.
 Garment supporter. W Ogden.
 Garter, adjuster and fastener. W L Brad-dock.
 Gas engine. J Lalotailie and J J Graff.
 Gas from crude oil, making fuel. C F A Con-vert.
 Gazette holder. E Adam.
 Glass, apparatus for manufacturing plate. E P King.
 Glass melting tank oven. F Wrede.
 Grader and amalgamator. J A Armbruster.
 Grading railways, &c., machine for. C W Arch.
 Grain meter, rotating. J M Finch.
 Grain meter, rotating. E K Hayes.
 Grate, automatic water circulating fire. E D Ferris and G M Wheeler.
 Grinding machine. D H Church.
 Grooving machine. H W Morgan.
 Gun, cane. R F Cook.
 Gun carriages; anchor for field. A Noble and R T Brankston.
 Gun sight. C Behis.
 Gymnastic appliance for school desks. T Bessing.
 Hammock. T B Thomas.
 Harp. W W Batchelder, Jr.
 Harrow disks, machine for sharpening. J L Slaw.
 Harrow, spin tooth. M J Todd.
 Harvester. W McCloskey.
 Harvester. W McCloskey.
 Harvester, cotton. L R Turner.
 Harvester finger, cotton. A Levedahl.
 Hasp lock. J A Dixon.
 Hat forming mold. J Marshall.
 Heating and ventilating rooms, device for. C Mills.
 Heating systems, heater for hot water. F E Dack.
 Hooks for stretching curtains, machine for making. F Stienmann.
 Horse rake. C S Sharp.
 Horse rake. C S Sharp.
 Hose reel. W N Casson.
 Hosiery. S Silts and J E Wood.
 Hosiery cutting apparatus. J Mossop.
 Ice cream freezer. J M Skipper.
 Ice machines, pneumatic can hoist for. C A McDonald.
 Injector, air. J G Stamp.
 Insulating compound. A Gentzsch.
 Insulating tube. M Robinson.
 Insulator. L McCarthy.
 Insulator pin. G H Winslow.
 Jar fastening. R S Carr.
 Journal box, oil drawer. J H Surtin.
 Kitchen cabinet and churn, combined. J K Hodges and T C Dickson.
 Label holder. W G Duckett.
 Lacing hooks, machine for setting. J Keith.
 Lamp collar. L J Atwood.
 Lamp, incandescent. A C Carey.
 Lamp, minor's safety. J Graham and H Chapman.
 Lamps, adjustable desk bracket for electric. S G Garlock and B W Marshall.
 Last. F E Benton.
 Lathe centering device. R L Levin.
 Lawn sprinkler. J Dickens.
 Leather skiving machine. A J Tewksbury.
 Letter drier. D D Howard.
 Life boat. C Baswitz.
 Lifting jack. B F Lewis.
 Line fastener. W S Twitty.
 Liquid gage. A R Welch.
 Lock. D J Cable.
 Lubricating device. H P Humphrey.
 Lubricator. J Longinus.
 Lubricator. W O Nelson.
 Lumber or composition material, artificial. G S Mayhew.
 Magnetic separators, feeding mechanism for. G Conkling.
 Mail transporting apparatus. R A Morgan, Jr.
 Match box and cigar tip cutter, combined. T W Foster.
 Measuring machine, cloth. G P Conant.
 Metal shaper, combination. H J Hendey.
 Metal shaper, suspension. H J Hendey.
 Microphone. W Deckert.
 Milk purifier. R H Caswell.
 Molding apparatus. J Shaber.
 Molding machine. W Edgar.
 Mole trap. M E Parham.
 Mortising machine, veneer. H C Ward.
 Motor. A E Whitaker.
 Musical instrument, mechanical. G B Kelly.
 Nectie. G Selowsky.
 Nut lock. J H Burrows.
 Nut lock. S W Wright.
 Nut making machine. A Urban.
 Ordnance, sighting and indicating, appa-ratus for. H H Greuffell.
 Ore separator and classifier. J P Foley, B H Dunshee and D H Anderson.
 Packing for rock drilling engines. G M Githens.
 Packing, piston rod. A H Clark.
 Paper bags, making. A A Lorenz.
 Paper feeding mechanism. E Dummer.
 Pasting device for sheets, dies, strips, &c. A Day.
 Pasting table, folding. L Maurer.
 Peeling table, fruit. F M Anderson.
 Pen rack. W S Mendenhall.
 Pencil sharpener. A Werner.

Perforating machine. G B Kelly.
 Photographic camera multiplying attach-ment. D S Cole.
 Pipe, clip for use in making joints in cast iron. E H Gowing.
 Pipes in situ, manufacture of monolithic. E L Ransome.
 Pitchers &c., shield for. M L Buckley.
 Planter, hand corn. P Schendzelos.
 Potato digger. J A Buck.
 Pressure, apparatus for indicating and regu-lating fluid. J H Gartrell.
 Printing machine. G P Cottrell.
 Projectile. F M Ashly.
 Pulley, expansible differential. W Roney.
 Pump, centrifugal. G W Price.
 Pumping machinery. M Foster.
 Railway, conduit electric. H A Goreham.
 Railway, conduit electric. W F Jenkins.
 Railway, conduit electric. W C Keithly.
 Railway crossing gate. G C and T A Cor-bin.
 Railway, induction electric. C E Roehl.
 Railway rail and joint, combination. W H McCormick.
 Railway rail clamp. D B Ruffner.
 Railway rail girder joint. J M Price.
 Railway signal. C C and G F Kahne and A A Adkins.
 Railway switch. F Brown.
 Railway switch, electrically operated. W S Gavey.
 Railway tie. R Dinsmore.
 Railway tie. J Neale.
 Railway, underground conduit. W F Jen-kins.
 Railways, system of elevated and surface. C H Barrows.
 Razor blades, &c., Machine for hollowing. J Leresche.
 Respiration, device for producing. J M Pressey.
 Rheostat. A J Shaw.
 Rock breaker, subaqueous. P S Ross.
 Rock crusher. C E Wynum.
 Rock drilling and boring machine. I N Day.
 Rock drilling and splitting. G M Githens.
 Rolling mill. R G Wood.
 Rolling roll, metal. W E Harris.
 Rails for side bearing suspension rails. P Eckel.
 Roof or floor, fireproof. T A Lee.
 Rotary steam engine. W M Baroes.
 Rotary steam engine. W M Byrd.
 Sash balance. W K Morgan.
 Sash fastener. P C Doliver.
 Sash holder. C E Heil.
 Sash holder. C S Lee.
 Sash lock and support. J S Henry.
 Scale, druggist's weighing. E Kelly.
 Scarf pin. H Bernstein.
 Screen. L G Beers.
 Secondary cell or battery. G B Henry.
 Separator bowl, centrifugal. D J Davis.
 Shade hanger, extensible. J Joseph.
 Shaft coupling, slip. T L Baumgarten.
 Shelf, book. G Wenker.
 Shingle machine. T C Davis.
 Sifter, ash. L Youngquist, F L N Mehrtens and A Yonngquist.
 Skating rink. M T Mead and S M Clemens.
 Smoke consuming furnace. J F Chazotte.
 Soap server, toilet. H B Potter.
 Soil separator. M A Lutzner.
 Speed varying mechanism. H H Commings.
 Spindle stop protector. E Jagger.
 Spinning machinery spindle. E Smith and J M Howson.
 Spooling machine stop mechanism. O Le-ver and W S Grundy.
 Spooling machines, automatic tension regu-lator for. W H et, George.
 Spring catch. A Ludwig.
 Stalk cutter and rake, combined. J Priestley.
 Stamp attaching machine, postage. O J Moo.
 Stamp sticking device. C A Sprague.
 Stamps to envelopes, machines for attaching postage. C Elliot.
 Stapling and cutting machine. C E Parks and L Mollart.
 Stapling and cutting machine. C E Parks and L Mollart.
 Steam and gas generator and engine, com-bined. N Eaton.
 Steam boiler. J E Green.
 Steam trap. F M Ashly.
 Stone, artificial. A Wallenberg.
 Stone working machine. R D Field and E O Pratt.
 Straw stacker, pneumatic. J W Nethery.
 Straw stackers, centrifugal discharger for. F F Landis.
 Straw stackers, centrifugal discharger for pneumatic. F F Landis.
 Straw stacking machine. M T Reeves.
 Street sweeper. J E Hilton.
 Stuffing box. H G Williams.
 Surgical ligature holder. H A Kaysan.
 Surgical table. O Grasmann.
 Switch attachment. G D Warren and J Casey.
 Switch lock. S E Barlett.
 Swivel bracket for rods. T Morris.
 Table and bed, combined folding. R Et-tinger.
 Telephone. S D McKelvey.
 Telephone, magneto. S D McKelvey.
 Telephone, magneto. S D McKelvey.
 Telephones, coin controlled and coin return lock for. J M Dashiell, Jr.
 Tenoning machine. W H Bennett.
 Thermometer, magnifying. S G Denton.
 Tile machine. J Adamson.
 Tin boxes, machine for expanding. T S Edgar and C E Williams.
 Tire, Pneumatic. G N Monro, Jr.
 Tire tightener. I L Carman.
 Tire, &c., hand pump for inflating. J Dick-ens.
 Tobacco ordering apparatus, moistening chamber for. G A and C A Peple.
 Toe weight. E G Miles.
 Tooth pick cutting machine. J Powers.
 Toy. E Lindner.
 Toy parachute. C G Tiefert.
 Track cleaner. J Olson.
 Train lighting and braking system, electric. G W Swartz.
 Tray, invalid. A Bender.
 Tray, smoker's. W H O'Dwyer.

Tricycle. S F Estell.
 Truck. T R Campbell.
 Truck, car. E G Gibson.
 Truck, car. E G Gibson.
 Truck, car. J L Hardie.
 Truck, motor car. W A Dutton and J F Pictel.
 Trunk, piano. F E Davis.
 Trunk. W H S Westlake.
 Trunk fastener. W Braen.
 Truss. J Brickner and A S Herr.
 Tubes or boilers, fender for metallic. F K Roberts and G M Burroughs.
 Twine loader and take up. E Nelson.
 Type distributing apparatus. C F Hilder.
 Type writing machine. W P Quentell.
 Type writing machines, numeral adding or subtracting attachments for. J D Daugh-erty.
 Vacuum brake. W L Fitzhugh.
 Valve. G W Knapp and J V Chamberlin.
 Valve device. J Reichmann.
 Valve gear, gas engine. B H Coffey.
 Valve operating mechanism. J J Moore.
 Vehicle seat. J M McHenry.
 Vehicle wheel, metallic. C S Cannon.
 Vehicles, means for connecting draft animals to. T H Brigg.
 Vehicles, means for connecting draft ani-mals to. T H Brigg.
 Ventilator. W T Cottier.
 Vessels, apparatus for raising sunken. J and C Taylor.
 Vine fastening, grape. G E Ryckman and M Tucker.
 Vine stripper. M Maples.
 Wagon body. T Wagner and W Haberman.
 Walls or ceilings, finishing joint in wooden. G Knuwer.
 Washing machine. J Beltzer.
 Washing machine. L Kelly.
 Washing machine, reversing gearing. J G Crawford.
 Watch case spring. C Nols.
 Watchcases, tool for ornamenting. F Ecau-bert.
 Watch movement box. E C Fitch.
 Water gage. J C Rummel.
 Water heater. E Hayes.
 Water motor. J W Shipley.
 Water purifying apparatus. J H McDonald.
 Well drilling apparatus, bit for. S A Hor-ton.
 Wells, &c., removing articles from. L Maish.
 Wheel rims, joint for metal. J Friedenstien.
 Windmill. T D Cook.
 Windmill. C E Williamson.
 Wine cooler. T R Wickham.
 Window screen. W W Cole.
 Wire, apparatus for hardening and temper-ing steel. E Oddy, J Crossley, E and A Smith.
 Wire fabric machine. F A Williams.
 Wool washing machine. G L P Eyre and T J Hopkins.
 Wrapping machine. L C Crowell.
 Wrapping machine, newspaper. L C Crowell.
 Wrapping machine, newspaper. L C Crowell.

PATENTS GRANTED APR. 10, '94.

Abdominal supporter. A H Wade.
 Air brake retainers, controller and arlighter for. J K Lencke.
 Air brake retainers, controller and arlighter for. J K Lencke and F D Merchant.
 Animal shears. W Bell, J W Broomhead, and W A Jones.
 Animal trap. T Donlon.
 Annunciator, electrical. R L Hunter.
 Anger, post hole. G P Smith and J B Brun-ner.
 Axle lubricator. J Olson.
 Baling press. D J Murphy and J Richard-son.
 Baling press. G Schubert.
 Band cutter and feeder, combined. H Paul.
 Banjo. J F Barrows.
 Barber's shears. E Tolman, Jr.
 Barrels, &c., closure for. H C Campbell.
 Batter dropper. E L D Hoyle.
 Bearing, ball. S Elliott.
 Bearing, wheel ball. S Elliott.
 Bed, div. lid. J M Liechty.
 Beer, &c., apparatus for dispensing. J P Day.
 Bell, door. J R Sautter.
 Bicycle gear case. A M Moore.
 Bicycle gearing, changeable. H L Bailey.
 Bicycle support. J R Crunkleton.
 Bicycle wheel. B J Braggdon.
 Billiard ball. G H Burt.
 Billiard or other cues, chalk holder for. C A Knauer.
 Bird trap. A Baker.
 Boiler feed, automatic. L C Springer.
 Boiler furnace, smokeless. W S Plummer.
 Boilers or pipes, lagging for. C Ehrlicher.
 Bolt cutter. W L Dutcher.
 Boring machine. J Miner.
 Bottle, barber's. J B Edmunds.
 Bottle holder. V V Bacon.
 Bottle stopper. C F Moller.
 Bottle stopper. F B Thatcher.
 Bottle stopple. H C F E Snowman.
 Box blanks, machine for making. T L Kuntson and J Uri.
 Box nailing machine. W S D ag.
 Brake apparatus, fluid pressure. J K Lencke.
 Brake slack adjuster. W H Marshall.
 Brick and tie kiln. G N Phares.
 Brick kiln. F McCarthy.
 Brick machine mold. E Fernholz.
 Bridge gate. E Moore.
 Bridge shoe. G S Seaman.
 Brooder. S Q Duncan.
 Brush. H B Ashton.
 Brush, paint. G A Krichbaum.
 Buckle. A Morris.
 Buckle. D L Smith.
 Buckle, wire suspender. J F Molloy.
 Burglar alarm, portable. S C Lawlor.
 Bushing, barrel. A Kuehue.
 Button attaching machine. C E Denton.
 Can heading machine. M Jensen.
 Cane strips for splicing, machine for scarfing ends of. H E Morris.
 Car brake. G W Chandler and J C Dale.
 Car brake. P D Van Vradenburg.

Car brake mechanism. W Lawrence.
 Car coupling. S J Ford.
 Car coupling. C W Hinton.
 Car coupling. G Switzer.
 Car fender. W V McManus.
 Car fender. B Trauter.
 Car fender, street railway. E J Smith.
 Car lighting system, electric. W Biddle and P Kennedy.
 Card table. J O Meara.
 Carpet fastener. J A and C F Korbe.
 Carpet sweeper. S H Raymond.
 Cash and parcel carrier. T M Skinner.
 Casket trimming table. T B Hennessy.
 Caster, trunk. G Crouch.
 Chalk sharpener. G Hay.
 Chimney regulator. J Frerichs.
 Chuck, lathe. S Coons and E O Rogers.
 Chute, coal wagon. P Seibert.
 Circuit switch. E E Hersh, B F Woodward, and J W Petter.
 Clipper, hair. J K Priest. (Reissue).
 Clock striking apparatus. C D Brown.
 Clutch, machinery. W D Batz.
 Cock, safety gas. G W Chin and G Maiwald.
 Coin receiving apparatus. C C Clawson.
 Compressor or vacuum pump. E N Trump and J E Sweet.
 Concrete molding appliance. A Rau.
 Conductor hook. E W Mohrroff and C W Do-belin.
 Confections, machine for molding. F W Fix.
 Converter. C W Stickney.
 Convertible chair. L A Chichester.
 Corkscrew. E Becker.
 Corkscrew. F H La Pierre.
 Cot on, combined elevator, cleaner, distrib-uter and feeder for seed. T E Littlefield.
 Cotton gin breast. A Schulze.
 Couch, foiling. N Shulerud.
 Crib or bed, child's. A W Crossley.
 Cross tie, metallic. A G Bindington.
 Cultivator. T J McBride.
 Cultivator and drill, combined drag bar. W Hull.
 Cultivator and marker. G W Murray.
 Cuspidor holder. C E Kellogg.
 Cutter, knockdown. J K Fisher.
 Damper. J W Anderson.
 Dental handpiece. S H Brooks.
 Disintegrator. N Steadman.
 Dispatch tube system. W G Collins.
 Display rack. S P Demson.
 Display rack. O Magenau.
 Drilling machine. J W Brown, Jr.
 Drills, die for the manufacture of twist. J C Tatt.
 Dynamos to car axles, connecting. W Bid-dle and P Kennedy.
 Electric fountain. F P Shanafelt.
 Electric motor. E T Greenfield.
 Electric motor. J C Henry.
 Electric power appliance. B J Arnold.
 Electric switch. A T MacCoy.
 Electrical contact mechanism. J F Blake.
 Electrical foot bath. I A Isaacs.
 Electrolier, adjustable. C M McCamey and S H Root.
 Electrolytic apparatus. H Y Castner.
 Electrolytic cell. E A Le Sneur.
 Electrolytical apparatus. C Hoepfner.
 Enameling sheet iron ware. T Zwermann.
 End gate fastening device. C A Anderson.
 Envelope, safety. H R Horr and D H Mc-Fall.
 Envelopes, letters, &c., fastening device for. G E Lemmon.
 Fastening device for tubs, boxes, &c. F T Bradish.
 Feed mill. J O Smith.
 Feed water heater. J G Calvert.
 Fence. E A Goehring.
 Fence, portable. B J Leslie.
 Fence machine, wire. V T Briggs.
 Filtering apparatus, wine or beer. R Haag.
 Filtration of liquids. Z S Spalding.
 Finger protector. C H English.
 Firearm. A J Strong.
 Fire escape. C Doehler.
 Fire escape. E Lawton.
 Fireplace hearth bed. F F Faris.
 Fishing apparatus. H J Thayer.
 Flax straw, composition for degumming. H B Ware.
 Floor, illuminating. E L Ransome.
 Flour, &c., machine for mixing, weighing and packing. S F Ayres.
 Furnace air feeding device. T Craney.
 Furniture packing device. E F Tubach.
 Furrow opener and stalk knocker, combined. G W Murray.
 Garden implement. D and W Knuck.
 Gas apparatus. T Conley.
 Gas apparatus. C E White.
 Gas engine. J B Chase.
 Gas generator. D Stearns.
 Gas governor, station. J Hawkyard.
 Gas holder and purifier. D McDonald.
 Gas or hydrocarbon motor. W Seck.
 Governor for electric or other motors. S S Keith.
 Grain elevator. V Weber and J R Harrison.
 Gun embrasure joint. C Martin.
 Hammer, lathe and shingle. W A Wiley.
 Hand bag, lady's. M E Hoyle.
 Hand hole plates, device for fastening. N W Pratt.
 Harvester, corn. J Anderson.
 Harvester, corn. H R Stevenson.
 Hatchet. J C Scales.
 Hay carrier. A P Boyer.
 Hay lifter. O Briggs.
 Hay rake and loader. C E White.
 Hay unloading device. F A Kilback.
 Headlight. E C Glazier.
 Heel. J W Rogers.
 Heel cutter. A McDowell.
 High chair. G A Morfoot.
 Hinge. A M Granger.
 Hinge, lock. Z B Chase.
 Hoisting and conveying apparatus. S M Hewett.
 Hopple. H McGuire.
 Ices, coin actuated automatic mechanism for the delivery of. H Y Dickinson and A G Macculloch.
 Inkstand. W Hubbard.
 Insulator, trolley wire. L McCarthy.
 Key seating machine. W P Davis.
 Keyboard, transposing. A Marcy.

Kite for turning back, poultry. S K Smith.
 Kitchen cabinet. J H Keys.
 Labeling machine. J E Eschenbender, C J Welton and A L Stevens.
 Labeling machine. A L Stevens.
 Labeling, machine, etc. A L Stevens.
 Ladder, fire. J Bailey and M Nichols.
 Lamp, electric room heater. J E Gutzwiller.
 Lamp shade. A Seibert and J D Smith.
 Lap machines, safety stopping mechanism for. A H Morton.
 Lasting machine. J E Crisp.
 Lathe, engine turning. W Shepleback.
 Lawn edge trimmer. G F Wagner.
 Level attachment, spirit. A Schnell.
 Line light apparatus. W Lawson.
 Lock. C T Johnson.
 Lock opener, pneumatic door. J S Huepf.
 Locomotive, electric. W Lawrence.
 Locomotives, method of and means for speed regulation of electric. C L Lacey.
 Log backing machine. W W and F N Trevon.
 Lubricator. J Q Finch.
 Lumber load binder. E R Cassaday and W Weaver.
 Magnet, permanent. A T Collier.
 Measuring instrument. I M Hodge.
 Meat cutter, rotary. L T Snow.
 Medicines, device for administering. W B Pollard.
 Metal bars, testing. P H Dudley.
 Miner's flask. J Zweig.
 Mold. J M Huley.
 Monkey wrench. W R Willard.
 Mortising machine. G Weldon.
 Motor. M C Gilbert.
 Muffle kiln, downdraft. A M Strunsholm.
 Nickel and copper plates, refining. C L Richardson.
 Nut lock. C F Boyens and J S Burkholder.
 Nut lock. W G Kay.
 Nut lock. E H Thalaker.
 Oak. A H Barns.
 Ore separator. G Deertlinger.
 Ores, apparatus for the concentration or sep-eration of. M Stuckey and H Arthur.
 Oven. M C Farnum.
 Oven, direct draft bake. R H and D C Crane.
 Padlock. B F Loughmiller.
 Partition, fireproof. S G Brinkman.
 Percussion tool. W E Gibbs.
 Photographic operating attachment. A K Keller.
 Photograph operating machine. A K Keller.
 Photograph operating machine or attach-ment. A K Keller.
 Photographs, attachment for automatically operating. E T Gilliland and F W Toppau.
 Photograph stand. A D F Randolph.
 Photographic dark box. A D F Randolph.
 Photographic developing tray. A D F Ran-dolph.
 Piano action. F W Kringel.
 Piano, child's. G Schomig.
 Piano pedal locking device. G B Shearer.
 Pile point and permanent anchor for piles or cables. D Neale.
 Pipe and boiler covering. C Ehrlicher.
 Pipes, &c., cap and locking device for clos-ing. J Riling.
 Planing machine feeding device, metal. J S Detrick and L H Richtel.
 Planter, potato. T L Good.
 Planter, seed. J A Thompson.
 Plow, riding. W D Hott.
 Polishing mitt and dauter. T P Hebble-white and F Harvey.
 Polishing table knives, &c., machine for. E F Kuechler and H Starck.
 Pressure brake, fluid. F Thalnmeller, Jr.
 Printer, sign. W E Rose.
 Printing machine. C P Cottrell.
 Printing machine, oil cloth. W H Schoen-berg.
 Printing machine, plate. E S Bradford.
 Printing press, multicolor. W C Wendte.
 Propeller, boat. F P McElfresh.
 Pulley lines, rope clamp for. T Bevan.
 Pulp, machine for molding spoons or similar forms from. F Hubbard.
 Pump. J C and E A Tom.
 Pumping apparatus, portable. D Nolde.
 Punch and fire register. J M Black.
 Puzzle. J M Fuller.
 Proxylin, manufacture of solid compound-of. J H Stevens.
 Rail connection. T C Paulsen.
 Rails or other metal bars, machine for straightening. A J Moxham.
 Railway, electric. H S Prayn.
 Railway, elevated. L Anderson.
 Railway rail joint. L Anderson and L M Hosea.
 Railway switch. C J Mortimer.
 Railway switch rod. J Carnes.
 Railway system, electric. C D Tisdale.
 Railway time indicator. C Worth.
 Rake. A R Dickinson.
 Rattle rake. R Keeling.
 Razor wiper. W H Bridgman.
 Refrigerator. J R Davis.
 Regenerative furnace. M Wanner.
 Release hook, safety. J U Beckeman.
 Relishing machine. O F Amsden.
 Riprap mattress. D Neide.
 Roofing, anchor for sheet metal. G M Pat-ton.
 Roofing, sheet metal. E D Bovitt.
 Rotary engine. W Smith.
 Rotary motor. G Heinicke.
 Rotary steam engine. W Smith.
 Rubber, composition of matter for vulcaniz-ing. J M Raymond.
 Saw sharpening machine. D Hazard.
 Sawing machine, twin circular. M Garland.
 School seat and desk. T Todds.
 Screw thread forming machine. O Henning.
 Seat back, removable. A P Derby.
 Seed cleaner and separator, cotton. J W Smith.
 Settee arm. W C Bartol.
 Sewing leads to fabrics, machine for. K Necker.
 Sewing machine. M Gardener. (Reissue).
 Sewing machine needle. J M Farmer.
 Shade roller bracket, adjustable. G Cook.
 Shears. J H Anderheide.

Sheathing, fireproof. C Ehrlicher.
Shoe. B Scarinci.
Siphon. B Greve.
Sliding gate. W Woods.
Slipper. B Scarinci.
Smoke consumer. H Delaney.
Soap for toilet purposes, apparatus for dispensing liquid. E Lee.
Sole. W A Ford.
Spectacle bows, mechanism for making. F Eaubert.
Speed and power regulators for motors. H R Gale.
Spike drawing bar. L Landreth.
Spoons, mistake guard for. C A Quentell.
Stamping press. L Schuler.
Steam and hot water generator. D A Dickinson.
Steam engine 2. C T Porter.
Steam engine. N Tesla.
Steam generating appliance. C W Hicks.
Steam generator. A F Gillet.
Steam generator. G Zahikian.
Steam motor. J H and J D Lucas.
Steam, superheating. W Schmidt.
Steam trap. J L Chapman.
Steaming appliance, face. M De Witt.
Stereopticon. E Hudson.
Stone, marble, &c., mechanical sawing and molding. F J G Fromholt.
Stool, folding. M O March.
Stove, lamp. C S Upton.
Stove lifters, &c., device for suspending. O J Baldwin and J L Kerstetter.
Stoves, ranges, &c., bracket holder for. H Eiben.
Street sweeper. W H Walls.
Sugar refining apparatus. J Lach.
Switch stand, automatic. J W Murray.
Tape from leather board or other material, making. W P Gay.
Telephone transmitter. J and H M Goodman.
Thistles, composition for exterminating Canada. R B Hall.
Thrashing machine band cutter and feeder. J W Rhodes.
Thrashing machine self feeder. R L Dennison.
Tile roofing. G H Babcock.
Tires, machine for making shoes or covers for pneumatic. G C Moore.
Toe weight. W N Carlisle.
Tool handle. W J Johnson.
Toy. W H Kline.
Toy, knockdown. H S Kerr.
Trolley, ice cutting. R W Thompson.
Trunk, collapsible. E J M Clemens.
Trunk handle. G Couch.
Tuyeres and pipes, machine for forming. M L Williams.
Type, art of and apparatus for coloring the printing surface of cast. M M Gillam.
Type writer cabinet. H T Conde.
Valve and joint. C S Bayler.
Valve, brake cylinder pressure graduating and maintaining triple. J A Steininger.
Valve, center. C Bahuet.
Valve device. W A Drowett.
Valve device for duplex engines. W A Drowett.
Valve, engine. W H Jenks.
Valve for air brakes, releasing. J G Sarvent.
Valve for hydraulic pressure, controlling. A Kampf.
Valve, pressure reducing. G M Davis.
Vaporizer for hydrocarbon motors. J H Knight.
Vehicle. C H Stratton.
Vehicle brake, automatic. H L Bailey.
Velt clasp. H L Alexander.
Vessel and propelling mechanism therefor. R Folsom.
Vessels, ice wing for. N C Jessup.
Waistband for trousers. J S Schwarz.
Washbench and clothes bar, folding. W H Forester.
Warning safe. A Maag and F S Horn.
Washing apparatus. W Arnold.
Washing machine. V Cernak.
Waste and supply coupling, bath. F M Mackin and C R Schmidt.
Watch. J W Nunnemaker.
Watchcase pendant. W S Richardson.
Water closets, &c., valve for. T R Keyworth, Jr.
Water gate. F M Ashley.
Waterproofing fabrics, compound for. E J Kowiton.
Weighing and measuring machines, register for grain. V Weber.
Windmill. F A Franklin.
Window and insect screen. E C Kreh, Jr.
Window fixture. J R and J E Lambert.
Wire coiling apparatus. H Polte.
Wire galvanizing apparatus. G M Wright.
Wire stretcher. G J Cline.
Wooden pipe. E T Wheeler.
Wooden vessels, manufacture of. T K Parrish.
Work holder. M P C Hooper.
Working barrel protector. C E Lasher, W J Webster and D L Newton.
Wrench. J A Lowe.

PATENTS GRANTED APR. 17, '94.

Acid, apparatus for distributing carbonic. E Ruch.
Air and gas mixing apparatus. W Hay and W M M Kearns.
Air heating apparatus. J Howden.
Album, photograph. J Ekval.
Amalgamating ores, method of and apparatus for. H F Edwards.
Ammonia liquor, apparatus for causticizing. E Solvay.
Ammonia, purifying. E Solvay.
Animal trap. F J Bragunier.
Armature. E Eggar and F A Wessel.
Armature, electric motor. H P Brown.
Armature for dynamo electric machine. E Thomson.
Autographic register. W L Egry.
Axle box, car. G W Griffiths.
Axle box dust guard. T H Symington.
Axle box dust guard, car. W H Wright.
Axle lubricator, car. W H Wright.
Ballot box. H H Niebur.
Basket, waste paper. E L Weston.
Bearing, anti-friction ball. H La Casse.

Bearing for shafts of lawn mowers. E G Passmore.
Bearing for wheels, &c., thrust. J S Chace.
Belt regulator, automatic. E Eggar and F A Wessel.
Revetage, apparatus for making carbonated. J Macksey, W Helmer and G E Barton.
Bicycle. H La Casse.
Bicycle. C E Whitaker.
Bicycle crank. F F Ide.
Bicycle, folding. M B Ryan.
Bicycle lock attachment. W and S H Lamb, Jr.
Bicycle stand. F B Mueller.
Billiard cue lock. H C Hart.
Billiard tables, device for making balk lines on. S S Harman.
Blind stop. L Jobin.
Bolt cutter head. F W Bruch and H P Eilers.
Bolt socket. B Heymansson.
Book, duplicating order. E D Gibbs.
Book rack. G W Parker.
Boot or shoe uppers, machine for creasing. G Night.
Boring machine. C W Meggenhofen and A S Courtright.
Bottle washer. H La Casse.
Bottles, machine for removing tin foil from. E Rantz.
Bottling machine. R Kolliker.
Box cover, adjustable. G W Stoker.
Bracket and card holder. F J McArdle and J B Faray.
Brick machine mold. J Leinhardt.
Brick machine plunger. J Leonhardt.
Bridle. J R McLeod.
Boiler. W Hailes.
Brush, revolving cleaning. W R Nightingale.
Building. C A Praray.
Bundling machine. W F Hutchinson and A J Tyler.
Burglar alarm. G W McLaughlin and W L Galkut.
Burial casket. L Stein and N Rappleyea.
Button finishing machine. H A Berger.
Cabinet, parasol or umbrella. A Reyer.
Caddy, flour. A Palmer.
Calculating machine. S R Stallard.
Calculator for wages. D L Albert.
Car brake. F E Gilling.
Car coupling. W Dunlap.
Car coupling. J La But.
Car coupling. J W Ramsey.
Car, electric motor. H P Brown.
Car fender, tram. F S Hogg.
Car grain door, box. C F Langell.
Car, mail or express. C Zimmerman.
Car starter and brake. C H O Leverkus.
Car ventilator. G A Boyden.
Cars, controller for electric railway. W H Knight.
Cars, safety wrench for unloading. T Nicholson, Jr.
Cash drawer and manual recorder. E H Minnigh.
Cash register, indicator and recorder. H Cook.
Cash register, indicator and recorder. W T McGraw.
Cask. T G Stevens and J Baker.
Ceiling, metallic. C C Moore.
Center board, boat. J Couch.
Chain. R A Beul.
Chain, drive. T Gausaden.
Chain making machine. R G Barnes, H D Pometoy and E W Keyes.
Chair seat. R L Bent.
Chest, tool. J L Waggoner and W T Carmichael.
Chimney cowl. H F A Fainlader and G F Koch.
Chlorine, making 2. W Donald.
Chopping knife. F H Randall.
Cigar tip center and dice throwing apparatus. R and E Rabiger.
Cigarette machine. L L Maxfield.
Chest, ceiling. H P Roll.
Chest, ceiling. H C Wirt.
Clevis. S E Bricker.
Clip for letters, accounts, &c. E Keller.
Clock, electric tower. C D Warner.
Clothes line swinging support. B M Easley.
Clothes wringer and wash tub, combined. C F and W Lewis.
Clover feeder. W E Ayers.
Cock, gas burner. G A Ries.
Coin controlled machine. W T Lewis (re-issue).
Collapsible box. A Orth.
Compensator. W Daves.
Condenser and feed water heater, combined surface. J B McCurdy.
Cooler for cider bottles. S R Fellows.
Corn cutting and shocking machine. A B Robinson.
Corn separator, husker and fodder splitter. C H Taylor.
Corn shocks, device for loading. G W Collins.
Cotton, machine for handling and cleaning seed. W E Elam.
Couch, swinging. J Keller.
Counters bars &c., combined arm rest and guard for. W C Huss (re-issue).
Crimping machine. S W Jamison.
Cup, funnel and stopper sealer, combined. A C McAlpin.
Cupola furnace. J Blakeney.
Current motor, universal phase alternate. T Duncan.
Cut out meter. C D Haskins.
Deflector, light. D E Hawkins.
Derrick. W R Close.
Desk, wall. J F Figgins.
Dice throwing device. C S Grove.
Dish cleaner. F H West.
Display rack, rotary. F A Jewett.
Door hanger. M C Richards.
Door stop. W M Coats.
Dress protector. O H Still.
Drop press. G W Peck.
Dry goods board. G Tetreau.
Drying chambers, apparatus for hanging webs in folds in. W Mather and J Christie.
Dust pan. L A Powers.
Dye, blue. K Krekeler and P Kraus.
Dyeing apparatus. A Dreze.
Easel. G Faint.
Egg tray. F F Bischoff.

Electric current recorder. J W T Olan.
Electric current regulator. A G Watterhouse.
Electric machine, coin controlled. R J Merker.
Electric machine, dynamo. H E Dukeman.
Electric machine regulator, dynamo. L Bell.
Electric machine regulator, dynamo. W H Elkins.
Electric machine regulator, dynamo. C L F Muller.
Electric meter. T Duncan.
Electric motor. H P Brown.
Electric motor controller. W Cooper.
Electric motor, cooling. E Thomson.
Electric starting switch. F V Henshaw.
Electric switch. A Ekstrom.
Electric switch. J B Smith.
Electrical contact mechanism. J F Blake.
Elevator door operating mechanism 2. E C Jenkins.
Elevator gate, automatic. J McLaughlin.
Elevator legs, means for operating. J H Finley.
Excavating and refilling, system of. B J Coyle.
Exhibitor, casket or coffin. W P Sherman.
Fence machine, wire. W P Randall.
Fence, wire. J and C Lane.
Fiber brake, crusher and cleaner. J F Lester.
Fiber feeding machine. A H Morton.
File for keeping records. D E Thomas.
Firearm, breech loading. E Elder.
Fire escape. W S Parman.
Fire extinguishing apparatus. A L E Lechartier.
Fish culture, nursery pond for. C A Hoxsie.
Fish pond, artificial. C A Hoxsie.
Foot rest. C B Denarest.
Furnace. A B Cove.
Furnace. A L Engelback and S E Bretherton.
Furnace cast house, blast. C L Miller and J R George.
Furnace cast houses, mold for blast. C L Miller and J R George.
Furnace for treating refuse of cities. J J Storer.
Garment, dancer's. M L Fuller.
Gas, apparatus for charging liquids with. E Ruff.
Gaseous products in breweries, method of and apparatus for the recovery of waste. O Zwietusch.
Glass, making rose red. A Spitzer.
Gate. J W Smith.
Gravestone or monument. O W Smith.
Gun, cane. O Jarke.
Hammock stretcher or spreader. R C Finkle.
Hand bag. J M Allen.
Harness strap. G A Whipple.
Harp. W J Ritchie.
Harrow disk sharpener. J T Barker.
Harrow, pulverizing. J Boston.
Harrow, rotary. H Gromer.
Harvester, corn. E E Witter.
Hay loader. I E Lump.
Heating apparatus, hot air. H P Jndson.
Hedges, mode of appliance for plashing. M Neil.
Heel. W Morrison and W H Parser.
Hinge. T Garsden.
Hinge. W B Benning.
Hitching device, horse. J G Engberg.
Hook. D W Holden.
Horse shoes, combination tool for punching and creasing. S Whalin.
Hub, metallic. J H Gray.
Hydraulic elevator. C J Dudley.
Hydraulic elevator. J G Stamp.
Hydrocarbon burner. A J Blackford.
Ice cream freezer. J Schaller.
Incubators, thermostatic regulator for. G Ertel.
Insulating turn buckle. H P Bal.
Insulator, strain. L McCarthy.
Iron braking machine, pig. C L Miller and J R George.
Jute or other bagging, treating. A Lehman and C J Kraus.
Keg rolling machine. W Arnenmann.
Lamp. G A McCay.
Lass, block fastener. C W Moore.
Lawn sprinkler. S S Black.
Line prop. W C Applegate.
Loom picker motion. J H Paige.
Loop banding machine. J M Parker.
Lubricator. R Lawrence and J Blackford.
Magnets of alternating current dynamos, means for exciting field. L Bell.
Matrix drying machine. E and A E Hall.
Measuring instruments, damping device for electrical. F Holden.
Measuring instrument for multiphase systems, electric. E W Mix.
Metal sawing machine. J F Landahl.
Metallic tie and rail fastener. W T Arms strong and G H Wadsworth.
Mica, splitting. J Foulds, Jr.
Milk bottling machine. W A Clark.
Milk can attachment. A D Richman.
Milking machine. R Ferguson and A T Danks.
Mirror, combination. P Wiederer.
Mold foundation. C L Miller and J R George.
Mower attachment. M Szakalski.
Mule and twiner, self acting. J R Wain.
Musical instrument. A H Beyer.
Musical instrument. F A Richter.
Nail making machines, feeding mechanism for wire. A Guttin.
Nut lock. F B Wallace.
Oil can. F E Williamson.
Ore crushing mill. A Burson.
Ores, extracting impurities from hematite. W S Potter.
Packing vehicle wheels, device for. F G Davis.
Paddle wheel boat. J S Kunuth.
Paint, luminous. C Kent.
Paper cutter, roll. D McLachlan.
Paper manufacturers, pulp catcher for. A G E Fullner.
Pastry or confectionery, machine for forming articles of. D M Holmes.
Peeling knife, fruit. N B Hale.

Photographic film holders, registering and marking apparatus for. H Mackenstein.
Piles, method of and apparatus for preserving. A A Pollhamus.
Pipe from mandrels, removing artificial. W A Tipson.
Pipe joining device. W A Tipson.
Pipe making machine. W A Tipson.
Pipe wrench. J P Wynn and T W Gillespie.
Plane, carpenter's. W E Crompton.
Planer, automatic gear. W and J E Gleason.
Planter, corn. G P Kuhn.
Preserving case. H D Streater.
Printing device, hand. R Smith and W F Tripp.
Printing press delivery apparatus 2. S G Goss.
Printing presses, perforating mechanism for cylinder. E Kellner.
Printing wall paper, machine for. C F W Lehmann.
Pulverizer, land. H C Brookens.
Pump. D F and H Selzer.
Pump, air. A Wolff and T R Hyde, Jr.
Punch, ticket. J M Black.
Pyrometer. E A Uehling and A Steinbart, (re-issue).
Pyroxylin solvents and their products, manufacturing 3. C O Zeller.
Railway bond, electric. J Meyer.
Railway bridge rod. H A Morin.
Railway conduit, electric. P P Banholzer.
Railway, elevated. C C Burton.
Railway, gravity. J W Cawdery.
Railway signal, electric. R F Rex.
Railway switch, automatic. O E Seiferl.
Railway system, electric. C D Tisdale.
Railway track and car. C C Burton.
Ranges, stoves or heaters, fire box and grate for. A R Isaacs.
Refrigerating machine. L Block.
Refrigerator. J Denson.
Refrigerator. G Fee.
Reverberatory and regenerative furnace. E P Gray.
Rheostat. A C Dinkey.
Rheostat. J P B Fiske.
Road worker and scraper. O W Stearns.
Rods, machine for straightening. P M Haas.
Rotary engine. G W Morthland.
Rotary engine. R Nadenicek.
Rotary. B M Wilkinson.
Rotary steam engine. H Williams and T L Fisher.
Saccharine juices, purifying. G G Tiemann.
Sack fastener. A S Procter.
Sail iron heater. W R Lee.
Saddle, gig. C A White.
Sate lock. W H Heller.
Salt and pepper distributor. C M Berry.
Sash balance. F L Rosentreter.
Sash fastener. G M Kimball.
Sash holder. J W Evans.
Sash holder. W H Masterman.
Saw frame. R J Moxley.
Saw set. H Marshall.
Sawing machine, circular. E E Thomas.
Scale, pendulum. W J Graves.
Scraper, road 2. T R McKnight.
Screw driver. S I Snyder.
Seal, bottle. L Robinson.
Seeds in envelopes, machine for packing. E Ran.
Shade, window. E Horn.
Shades, attachment for vertically adjusting window. A W Collison.
Sheet metal can and manufacturing same. J Lee.
Sheet metal cans, machine for forming and soldering. D D Ranney.
Sheet metal pipe. C S Handlin.
Shock compressor. E W Newberry.
Shoe shanks, sheets for metallic. G D Bartlett.
Signaling device for crossings, automatic electric. E A Hermann.
Skate. F Kalkner.
Skinning knife. M Caden.
Smoke preventing furnace. J A Baldwin.
Snap hook. R A Brenl.
Sorting cards and compiling statistics, apparatus for. J K Gore.
Spindle bearing, combined. G O Draper.
Spring shackle and oil distributor, combined. R A Hammond.
Stamp canceling machine. G E Barnard.
Stamping machine. A E Grant.
Steam boiler. J Cahall.
Steam boiler. G Cawley.
Steam boiler. M N Forney.
Stone, artificial. E Goode.
Stop motion, electric. J Weir.
Store service apparatus. J W Thew.
Sulky. W F and S E Limpus.
Sulky. G J Loomis.
Suspenders. F Wieland.
Tank mold, water. H F Tricker and A Bartler.
Tawed skin and making same. W M Norris and H Burk.
Telephone exchange system 3. J I Sabin and W Hampton.
Telephone system. J I Sabin and W Hampton.
Telephone transmitter from secondary batteries. J J Garty.
Telephonic apparatus. C Milde.
Telephony, multiplex. W W Jacques.
Thermo electric generator. H B Cox.
Thermometer. M Byrne.
Thrashing machine teeth, wrench and straightener for. E W Oakley.
Tile, roofing. J Veen and F A Dornberg.
Tin plating machine. C R Britton.
Tire, pneumatic wheel. T A Egan.
Tool, combination. F E Snyder.
Toy, marble shooting. E M Velsor.
Trolley wheel. J D Ausley.
Trolley wire finder, automatic. T Straus.
Trousers. J E Leavitt.
Truck. J M K Pennink.
Truck and hoist, combined. J P B Fiske.
Truck for railway trains, pneumatic buffer. C J Gray.
Truck, railway. E Egger and F A Wessel.
Tube stopper. E W Oraine.
Twine box. J W Herriott.
Valve, fluid brake. H Taber.
Valve, hydrant. C H Watson.

Valve mechanism, rock drill. R L Ambrose.
Vehicle cover and support therefor. J H Ran.
Washing machine. F Jackson.
Water module or delivery regulator. C A D'Elbro.
Water wheel regulating apparatus. C B Sessions and B C Van Emon.
Watering pot. J B Wooterspoon.
Weigher, rotating grain. J Sudbrook.
Wells, piston for artesian or oil. W H Downing.
Wind mill. A V Winegarden.
Window, slide. M Zeunier.
Wire loops, machine for forming. D White and A F Lagarwall.
Wire stretcher. G W Hughes.
Wood, kindling. W F Hutchison.
Wood working machine. W Lyon.
Writing machine. E Griffin.

PATENTS GRANTED APR. 24, '94.

Animal trap. F D Hay.
Arm for firing fulminated sticks. J F Hardesty and R A Sale.
Armature for dynamo electric machines or motors. T H Hicks.
Armor plate, manufacture of. A A Ackerman.
Auxiliary heater. E Sheppard.
Axle box, railway car. U S Landers.
Bag or fodder tie. G C Ditzler.
Bale covering. C E Mallett.
Bale wires, &c., device for untying. O C Frame.
Basket, folding. E M Hudgin.
Bed brace 2. W H Parker.
Bells, protector for electric or other. L R Lecellier.
Belt, electric. P E Peterson.
Bending machine. W J Plecker.
Bicycle. C H Carr.
Bicycle. F Douglas.
Bicycle support. W S Pipes and F T Guiler.
Blow pipe, plumber's. W M Murphy.
Board, ripping or dividing machine. H W Stow.
Boat knee. A J Nickerson.
Boiler furnace and smoke consumer. R R Turner.
Boiler or other furnace, steam. D B Morrison.
Bolt or rod cutter. W March.
Book rest and table or stand, combination. R V Fitzhugh.
Boot or shoe. S Annenberg and E Stahl.
Bottle. F H Hutchinson.
Brake mechanism, slack adjusting device for. M J Grier.
Brick kiln, combination. G C Firestone.
Brick machine. H C Gilbert.
Brick machine, repress. D Brown.
Bridge. F H Hopper.
Building block. E Smith.
Bang. N Fuchs.
Bang. M Kragen.
Burglar alarm. C J Lyons.
Butler worker. D J Davis.
Button, cuff. J A Flomerfelt.
Button setting machine. A G Wilkins.
Buttomer, shoe. D H Muir.
Calculating system, electric. H Hollerith.
Can head cutting and shaping die. E W Morfoot.
Candelabrum. A C McKercher.
Car bell cord hanger. A H Maiden.
Car coupling. D L Barnes.
Car coupling. C Bickmeier.
Car coupling. J Cochran, Jr.
Car coupling. J R Hall, Jr.
Car coupling. C H W Relyea.
Car coupling. S T Smith.
Car coupling. F H Yinger.
Car fender. C F Thomas.
Car fender, safety. A W Stiefel.
Car fender, street. H F Rooney.
Car running gear. W H Daniell.
Car, safety railway. C R McManis.
Car wheel fender. S A Breen.
Car wheel grinding machine. W P Barclay.
Carding machines, &c., coiler for. H McBernott.
Carriage top. E A Sommerfruechte.
Cash register. H M Neer.
Chain mortising machine. J H Hall and D Parry.
Chair foot rest attachment. D S Clark.
Cheese, machine for molding Neufchatel. J B Ficht.
Chute regulator, cool. J F Schmudeke.
Cigar stump receptacle. A Scholz.
Clay working mill. G S Tiffany.
Clip, &c., for mail bag and other straps. R D S Tyler.
Clothes line support. C G Norlin and F Lindstrom.
Clutch. C Sinning.
Coach, invalid's. R R Bennett.
Coal drill. J W Shallenberger.
Coat and hat hook. F Taylor, (re-issue).
Coin controlled apparatus. C H Jacot.
Coin counter and deliverer. F W. Nall.
Computer brush. G W Brown.
Copy holder. R H Ross.
Copying manuscripts, &c., device for. J W Cleland.
Corn popping machine. W B Donathen.
Cotton press. S J Williams.
Cracker and making same. M B Manwarling.
Cultivator. G L Whiting.
Current circuits, apparatus for neutralizing the effect of self induction in alternating. J F Kelly and C C Chesney.
Curtain fixture. J H Fitzgerald and M A Gangh.
Cutting rolls. J A Hess.
Cycle support, automatic. R B Chambers.
Damper, pipe. L T Lenderking.
Dental chair. J Hood and S H Reynolds.
Dental disk carrier. G E Richmond.
Desk and type writer cabinet, combined. A B Dick.
Die for shaping metal press wheels. A J Green.
Die stock. J E Fahy.
Doors, electric releasing device for. S H Curwen.
Dovetailing machine. W McPherson.
Drilling machine. J and R Bohm.

POPULAR SCIENTIFIC BOOKS.

The A B C of Electricity, by W. H. Meadowcroft. Dynamo and Electric Motors, illustrated, by Trevert. Practical Treatise on Electro-plating, by same. Practical Treatise on the Incandescent Lamp, by Randall. Alternate Current Machinery, by Gilbert Kapp. Steam Boiler Explosions, by Zerah Colburn. Ventilation of Buildings, by W. F. Butler; edited and enlarged by J. L. Greenleaf. On the Designing and Construction of Storage Reservoirs, by Arthur Jacob, A. B. A Treatise on the Compound Engine, by John Turnbull, Jr.; with additions by Prof. S. W. Robinson. Safety Valves, by Richard H. Buel, C. E. A Practical Treatise on the Teeth of Wheels, with the Theory of the use of Robinson's Odontograph, by Prof. S. W. Robinson. On Transmission of Power by Wire Ropes, by Albert W. Stahl. Terrestrial Magnetism of Iron Ships, by Prof. Fairman Rogers. Cable Making for Suspension Bridges, as exemplified in the construction of the East River Bridge, by Wilhelm Hildenbrand, C. E. A Hand-book of the Electro-magnetic Telegraph, by A. E. Loring, a Practical Telegrapher. Transmission of Power by Compressed Air, by Robert Zahner, M. E. Turbine Wheels, by Prof. W. P. Trowbridge. The Telescope: its Construction, etc., by Thomas Nolan. Induction Coils: How Made and How Used. The Theory of the Gas Engine, by Dugald Clark. Electro-magnets, by Th. du Moncel. Dynamo-electric Machinery, by S. P. Thompson. Dynamo Electricity, by John Hopkinson, J. A. Schoolbred and R. E. Day. Recent Progress in Dynamo-electric Machines, being a Supplement to Dynamo-Electric Machinery, by Prof. Silvanus P. Thompson. The Steam Engine Indicator and its Use, by W. B. Levan. Hand-book of Mineralogy; Determination and Description of Minerals found in the United States, by Prof. J. C. Foye. Modern Gun Cotton: Its Manufacture, Properties and Analysis, by Lt. John P. Wisser, U. S. A. "The Inventor's Friend," by Joseph Allen Minturn.

Dry closet or commode. J L Marvin.
Dynamo, alternating current. J F Kelly.
Egg case. T F W Schmidt.
Egg crate. J R Oliver.
Electric circuits, cleat for supporting conducting wires for. H B Wyman.
Electric light support. W H Connell.
Electric lock. J Eldon.
Electric machine or motor, dynamo. A L Ricker.
Electric motors and replacing same, automatic device for removing resistance in starting. G H Wittingham.
Electric switch. W S Hill.
Electric switch. E Woltmann.
Electrical instrument table. J F Mehren.
Electrochemical decomposition, method of and apparatus for. H Carmichael.
Electrolytic cells, diaphragm for. E A Lesueur.
Elevators, hydro engine for operating. G H Reynolds.
Fan, reciprocating. W W McCall.
Fence, J C Quinly.
Fence, iron. T J Fariss.
Fence wire carrier and stretcher. W H Merritt.
Fifth wheel, vehicle. R Carr.
Fire alarm box. W H Kirman.
Firearm sight. F W Dodd.
Fire escape. F M Bender.
Fire escape. C E Harvey.
Fire escape, portable. J J Steur.
Fire hose, metal drilling attachment for. J G von Hofe.
Fireplace heater. H B Scoville.
Fire pumps or engines, water supply system for. G and G G Campbell.
Fish meal, making. P Waage.
Flooring boards, machine for matching ends of. J P Bureham.
Flue cleaner. E D Weston.
Frames, metal corner piece for. E T Shellberger.
Fuel economizer. L J Hirt.
Furnace. M H C Shann.
Furnace for treating refractory ores. F C Butterfield.
Furnace, liquid fuel. E S Sperry.
Furnaces, charging apparatus for filling blast. T F Withabee.
Game apparatus, check controlled. G W Brong.
Game apparatus, coin controlled. H Matern.
Game, coin controlled. J Roeber.
Game table. J L Schachet.
Garment protector. G Rooke.
Gas, apparatus for releasing carbonic acid. C F A Convert.
Gas, apparatus for the manufacture of. R M Bieleman.
Gas engine igniter. F Hirsch.
Gate. J Mason.
Glass paintings, manufacture of. O Dillmann.

Glue and gelatine from bones, producing. M Schroeder.
Governor, steam engine. D Symington.
Grading and ditching machine. W H Tidland.
Grain binder. B F Stewart.
Grain drill press wheel. A J Green.
Grain elevators, automatic shut off for. G W Nye.
Grate. T Craney.
Grate, shaking and dumping. W Fitzgerald.
Grater, nutmeg. G V Shaw.
Gun feed mechanism, magazine. F Mannlicher.
Gutta percha or rubber compound. R Huthison.
Harrow. J W Brown.
Harvest, potato. L L Young.
Hat trim punching machine. G E Prush.
Hay carrier and track. J E Porter.
Hay derrick. J R Bafop and J Geary.
Head rest. G W Archer.
Heating apparatus. R H Stubbs.
Hinge. J H Lawrence.
Hinge, spring. L R Pomeroy.
Hinge, spring. A H Wilson.
Hoisting and transfer apparatus. W D Sherman.
Hose cover. E H Cooper.
Horseshoe. F W Bach.
Horseshoe bars, machine for making. W J Kent.
Horseshoe blanks, machine for bending. W J Kent.
Horseshoe, combination rubber and steel. E C Scribner.
Hose leak stop or jacket. J B Cooper.
Hot water boiler. B Etienne.
Hydrocarbon injector burner. F M Reed.
Ice and for refrigerating, apparatus for manufacturing. J Schenerecker.
Ice cream freezer. W Vogt.
Iron, tool for making curves or other forms in Venetian. M H Hulbert.
Ironing machine. 2. F C Wendell.
Lamp, duplex arc. C E Scribner.
Lamp, electric arc. C Hoffmann.
Lamp, electric arc. R Segerdahl.
Last and stand, shoe. I G Hatcher.
Lathing machine. C Sinning.
Lathe for turning irregular forms. C Kunze.
Leather skiving machine. A E Perry.
Leg, artificial. W Andrews.
Letter case, portfolio, etc. A E A Ray.
Level, hand. J Paoli.
Life saving apparatus. L E Pease.
Lightning rod and coupling. J W Smith.
Liquid cooling apparatus. H Mendes.
Lock. F W Harris.
Lubricator. B A Burgess.
Lubricator. R W McIntyre and G A H Sprague.
Magnets, means for reducing the apparent energy supplied to alternating current. J F Kelly.

Mail box, house. E F Kinsey.
Malting floor. J F Dornfeld.
Mand lin. T T Seal.
Mask, protector. W T Moran.
Mower, lawn. M C Hendey.
Mowing machine attachment. W L Hay and R L Johnston.
Musical instrument. J B Birrer.
Musical instrument, fretted. W H R Toye.
Muzzle, animal. T H Johnson.
Necktie fastener. I Near.
Numbering machine, consecutive. C Spielmann.
Nut lock. E C Baynes and H Henderson.
Ovens by gas, apparatus for heating. J L W Olsen.
Packing, metallic. F A Ives.
Pail. J A Steward.
Pail cover. R J Kidd.
Pantograph roll or plate. J Hope.
Paper box. T F W Schmidt.
Paper, deck. L Danois.
Paper match box. G G Carbone.
Pedals for crank powers. A J Hayt.
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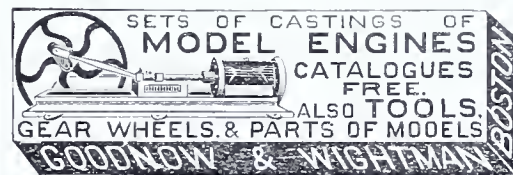
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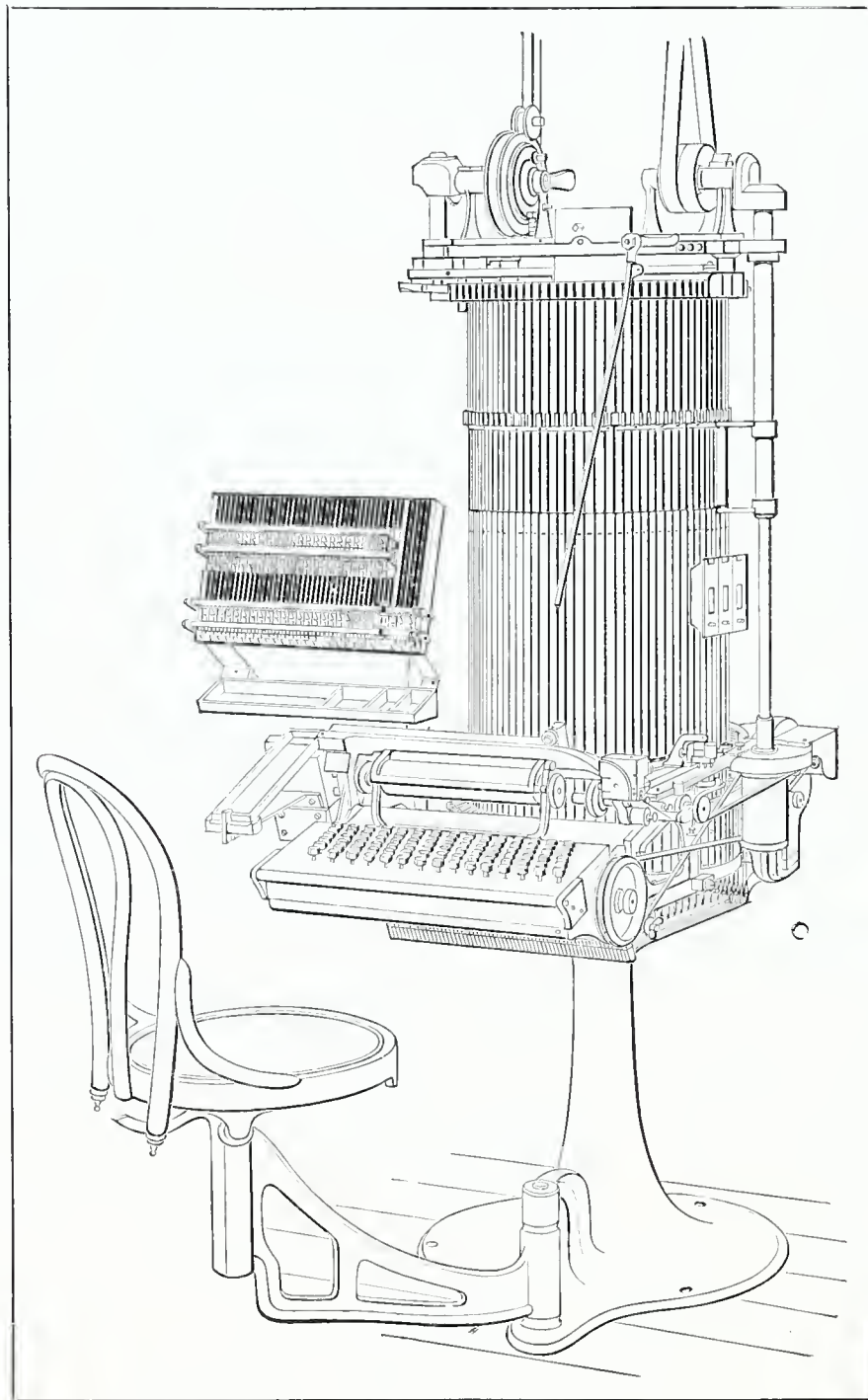
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	Time run.	Ems set.	Time run.	Ems set.	Time run.	Ems set.
Total for week, Dec. 1 to 7 inc.	h. m. 40 50	290,500	h. m. 41 55	282,500	h. m. 40 55	260,250
Total for week, Dec. 8 to 14 inc.	42 25	310,250	42 25	266,000	42 00	266,250
Total for week, Dec. 15 to 21 inc.	41 10	294,250	41 20	273,500	41 00	258,750
Total for 5 days, Dec. 22 to 28 inc.	29 50	222,750	31 00	210,500	30 50	195,500

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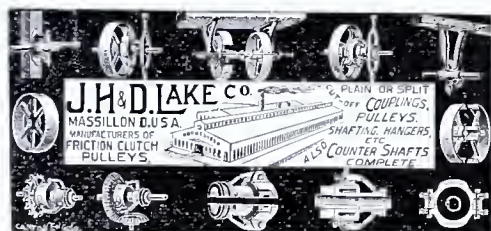
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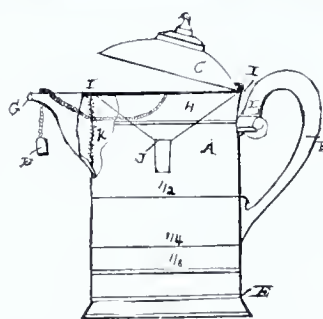
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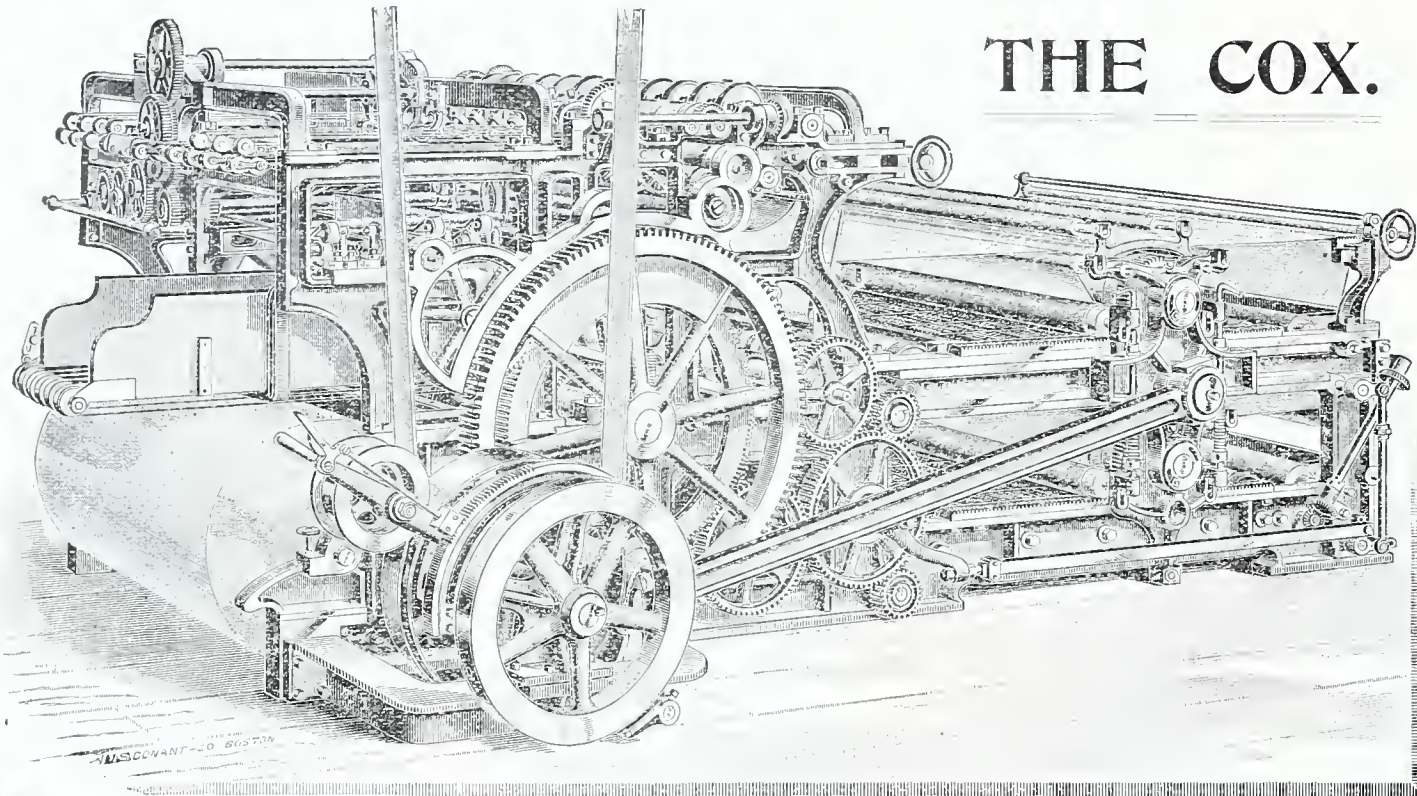
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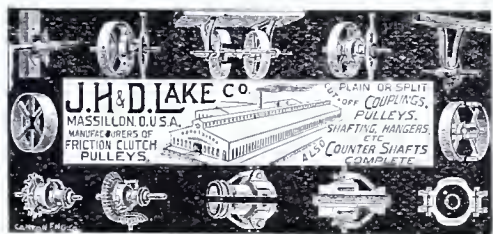
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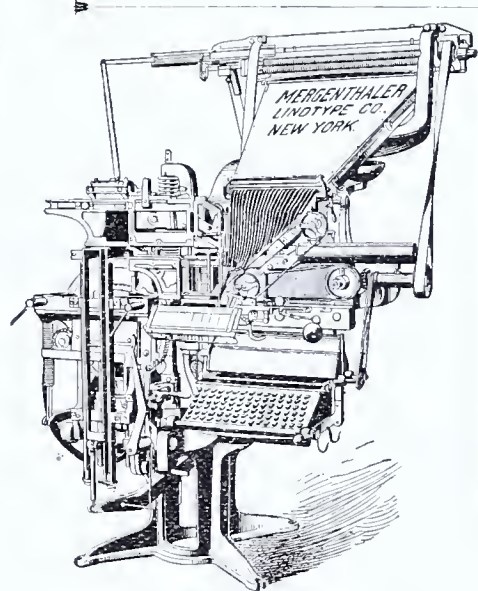
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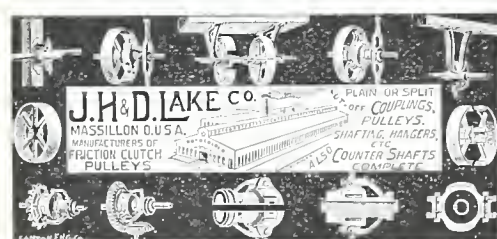
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AN AUTOMATIC CAR FENDER.

A Simple, Practical and Inexpensive Life and Limb Saving Device.

The maiming and killing of men, women and children by rapidly moving electric and cable street cars, and the demand, upon the part of the public and municipal, and other authorities, that these cars be equipped with life and limb saving devices, have inspired inventors to attempt to bring forth an apparatus that will meet the requirements. As a consequence quite a number of patents have been issued upon car fenders within the past few months; yet it will be noticed that the companies continue to use old style fenders on their cars. This is not because the management does not deem fenders an urgent necessity; nor is it because the companies do not wish to comply with the demands made upon them; but it is more particularly because the fenders thus far brought to the attention of street railway managers and operating superintendents have not been practical. Serious objection has been raised to the adoption of almost every one of them. Some have been so complicated as to make it utterly impracticable to adapt them to the cars; others have failed because they occupied valuable street room in front of the cars; and although fenders of this type would catch and hold an object thrown into them, they would also trip up people who would not otherwise be touched by the moving car, and assist in blocking streets where commercial traffic was heavy, or would be ground to pieces by the wheels of passing drays and wagons.

Most of the inventions of this character, however, had that prevailing weakness which encompasses almost every device constructed for the purpose of saving life—they failed to be effective at the critical moment. And thus the public and the street car managers have been compelled to wait until inventive genius solved the problem and gave to them a reliable and efficient automatic street car fender.

The difficulty in this direction has been to construct a device that would actually save the limbs and lives of persons unfortunate enough to be thrown beneath the wheels and low-running trucks of street cars, and not such a one as would reach out and drag people under the cars and crush instead of save them. When human beings have, by their own negligence or otherwise, been thrown under the car they are at the mercy of the death-dealing wheels and running gear, and beyond the reach of the car operator, except as he may be able to stop the car before the victim is mangled or killed;

and this, with his multiplicity of duties, the motor-man or gripman is seldom able to do.

The average passenger on an electric or cable car but little thinks of the responsibilities of the man who starts or stops the cars by picking up or dropping the cable, making or breaking the circuit, or throwing on or off the breaks. If you ask him he will tell you that he is both physically tired and mentally exhausted when his day's work is done—mentally exhausted by being compelled to prevent

they are just as anxious as is the public and authorities that their rolling stock shall be equipped to protect the lives and limbs of their patrons and the public who find their way beneath the wheels of the cars. They have been waiting for a car fender that would be simple in construction, practical in operation, and efficient in performance—one that would require no attention upon the part of the operator, and one which would automatically pick up the victim before the wheels or trucks had mangled limbs or crushed out life.

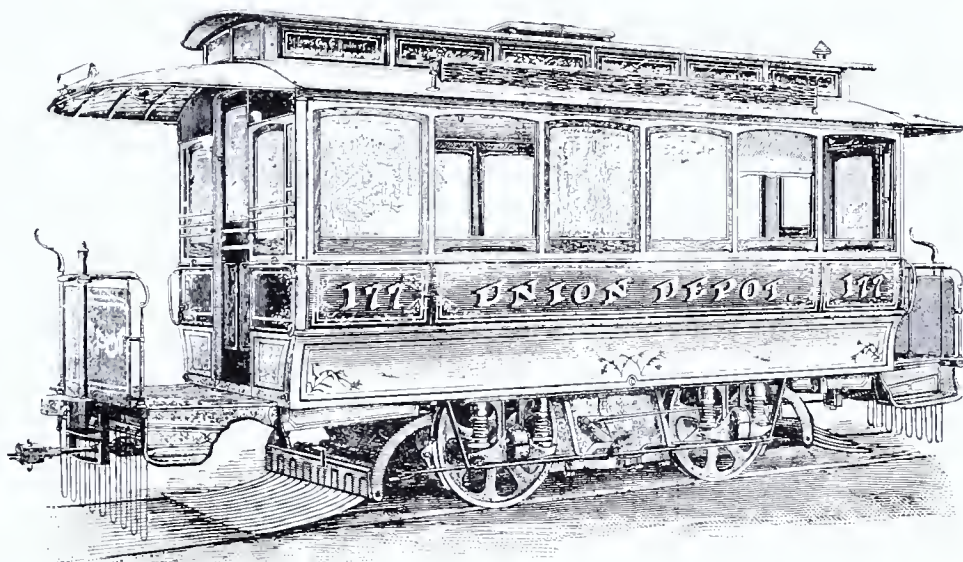
By reference to the accompanying illustrations of the automatic car fender invented by Eldridge J. Smith, it would appear that this problem has been finally and successfully solved. This fender is conspicuous for its marked simplicity and economy in both construction and operation, consisting practically, as it does, of a bar holding a set of feelers, a tripping device and a fender. The feelers are made of steel rods or wire screen, and are constructed to conform to any and all irregularities of road bed and track and protect bodies passing under them from injury by contact with bolts and brackets underneath cars, and can be adjusted to travel just as far above the surface of the road as is desirable, and to actuate the tripping device by a light or heavy pressure. Back of these feelers or screen, attached to a bearing, hinged at its lower base, hangs the fender proper, which is made of strong, flexible, round ended steel rods, slightly curved to form a convex, springy resting place for any object that may be placed upon it. These fingers can be tipped with rubber points if desirable. Ex-

tending forward from this fender to the bar holding the feelers or screen is a rod which, when moved backward, brings into operation an effective locking mechanism, in principle and action not unlike the most common means employed to set a gun-lock. This rod is controlled by the motorman or gripman through a hand or foot lever, as gongs are now operated on some street cars. It will be observed that the very instant an object passes under the

forward end of the car this fender automatically drops down and forms a perfect shield in front of the wheels, and that the flexible fingers pick up and carry the body along until the car stops and it is extricated.

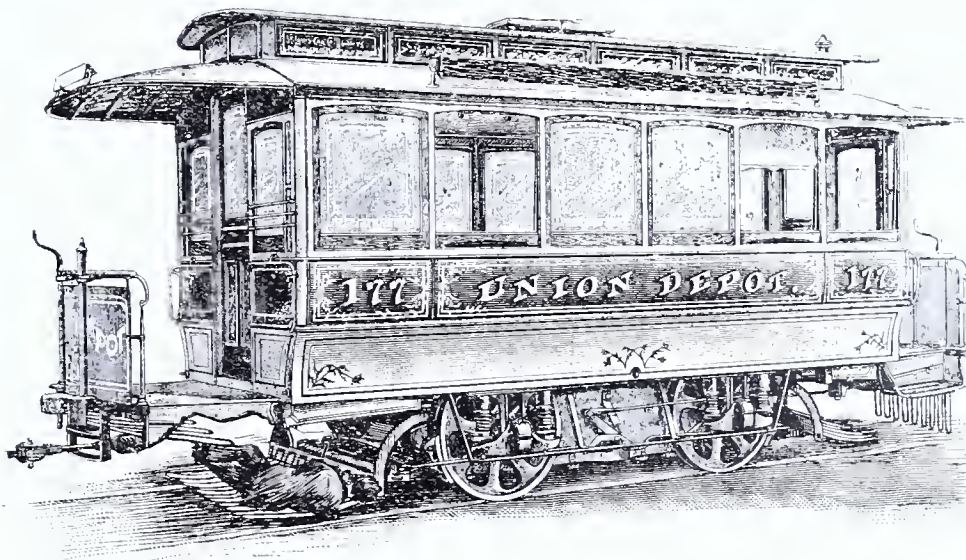
When the Smith fender, which is now owned by the Automatic Car Fender Co., with headquarters in Washington, D. C., is attached to the car, it is arranged for operation by means of this foot or hand lever. When the car is moving along the

(Continued on page 121).



AUTOMATIC FENDER IN NATURAL POSITION.

collision with vehicles controlled by reckless drivers, watching for signals from intending passengers,



AUTOMATIC ACTION OF FENDER WHEN STRIKING AN OBJECT.

obeying the bell calls of conductors, keeping his car from running down thoughtless men and women or crushing the life out of daring and reckless children, with the fear of being compelled to stand trial for having practiced criminal negligence, if not for a greater crime. And it is also because the more recently invented street car fenders have not been constructed with a view to diminishing the duties of the car operator, that railway managers have not adopted them. These managers, of all others, best understand the conditions and requirements, and

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WASHINGTON, D. C., JUNE, 1894.

IN a South Dakota case against the Western Union Telegraph Company for failure to deliver a message, Judge Smith decided that under the laws of that state a person cannot recover damages for "mental anguish."

THIS issue contains two articles of especial interest to street car operators. One in relation to the Smith automatic car fender and the other descriptive of the King Electric Closed Conduit system. The July issue will contain further information on these subjects.

THE successful termination and settlement of the railroad strike on the Great Northern railway by arbitrators affords a strong argument in favor of national legislation in favor of arbitration in so far as difficulties may arise between the employees and operators of railways engaged in inter-state traffic.

It has been demonstrated, during the pendency of the great coal strike, that it is possible to import English and Canadian coal into this country at from forty-five to fifty cents a ton above the regular price in New York, and this with a duty of seventy-five cents a ton. The advocates of free coal have been given an object lesson during the past month.

IN this issue appears the admirable paper "Procedure in Patent Cases," read before the American Association of Inventors and Manufacturers at its January meeting by Richard Henry Gatling, of New York. The instructions to inventors are clear and concise, and the synopsis of the patent laws and Patent Office rulings comprehensive and complete. This paper will be read with a great deal of interest by all persons interested in inventions and patents; as it seeks to impress upon the inventor the importance of business tact in securing a strong patent if he would realize benefits from his discovery.

ACCORDING to Mr. W. Kennon White of the Baltimore Traction Company, the life of a wheel on a cable car is about 400 days, but on electric cars, where the current is constantly returning through the medium of the rails to the power house, the life of the wheel is considerably less than a year. Mr. Kennon suggests that here is an excellent opportunity for American inventors. It has been said that "necessity is the mother of invention," and certainly there can be no doubt of the existence of a necessity for the invention of a car wheel that will successfully withstand the peculiarly destructive eccentricities of the electric current.

THE necessity of raising the standard of Patent Office practice through the medium of a Patent Office bar—admission to which shall be governed by certain qualifications possessed by the applicant—is admitted on all sides, and the question is just now

being quite generally discussed by attorneys and others. The suggestion of the INVENTIVE AGE that the interests of the inventor required that admission to the proposed Patent Office bar should call for degree of technical knowledge as well as legal ability, meets with approval. The best and most successful patent attorney is one possessed of sufficient knowledge of mechanics and engineering, to properly, intelligently and fully cover, in the plans and specifications, the rights of the inventor. However, mere technical knowledge is not sufficient, and whatever may be determined as the proper standard of the Patent Office bar it should encourage as far as possible the combination of the two qualifications—legal learning and comprehension of mechanical and scientific principles. On this subject THE INVENTIVE AGE invites the opinion of its readers.

THE demonstrations now being made by the industrial world in favor of the legal eight hours day, are likely to increase until public opinion shall be influenced in the direction of suitable legislation looking to a shortening of the hours of labor. The wonderful advancement in the invention and application of labor-saving machinery in all industries giving employment to labor has had the effect of lessening the demand for human exertion, and in times of great business depression like the present, the idle hands of the laboring classes results in great want and suffering. There is much logic in the theory that as labor-saving machinery is applied to the various industries, the hours of labor should be shortened, that the reward of labor and industry may be equitably divided among that class dependent entirely upon the opportunity of putting forth physical exertion for the necessities of life for themselves and families. The result of the inventive genius during the last quarter century now clothes the skilled laborer with excellent arguments in favor of fewer hours for a day's work.

THAT modern torpedo boats are destined to play no minor part in hostile demonstrations that may be indulged in on the part of the nations of the earth henceforth has been fully demonstrated by the recent maneuvers of the little Cushing and its companion, the Stiletto, at Newport. The torpedo boat Cushing, illustrated in the March issue of THE INVENTIVE AGE, recently left the Washington Navy Yard after receiving a new coat of paint—a very dark brown, almost black—and made her way to New York by the "inland route," to demonstrate the feasibility of this route for this class of vessels in case of hostilities on the high seas. The "Cushing" started down the Potomac River to Chesapeake Bay, proceeded up to Chesapeake City and thence crossed by the canal to the Delaware River, continued north to the Delaware and Raritan Canal, and by way of the Raritan River and Bay entered New York waters. She carried weight equivalent to her full equipment in time of war. To show the possibility of evading the search lights of the ponderous men-of-war the Cushing last summer made numerous trips out of the harbor at Goat Island and, after prowling around among the great war ships for an hour or more—any one of which might have been blown out of the water—she returned to her moorings undetected. On the 15th ult. a novel feat, no less remarkable, was witnessed at Newport. In this test the officers of the torpedo station search light were notified to be on the outlook for the Cushing and Stiletto. The color of the Cushing had been changed to deceive the officers but the Stiletto retained her dark-green color. The boats entered the range of the search light a few minutes after the appointed time. They stole over to the shore of Conanicut Island and passed along to Rose Island, where they crossed the harbor and came up to their anchorage while the officers with the light were looking for them at the entrance to the bay. The boats for ten minutes were in the clear, open channel, but their deep color against the rocky shore beyond caused them to escape detection. This indicates how helpless is the most ponderous man-of-war in the presence of these little impudent dynamite destroyers when skilfully maneuvered.

NOTES AND NEWS.

Monster Steam Whistle.—A monster steam whistle, made of brass, 3 feet long, has been turned out of the shops of the Philadelphia and Reading Railroad. It is said the whistle can be heard a distance of 30 miles.

Profits of Monte Carlo.—The season which has just closed is said to have been a very indifferent one for the Monte Carlo Gambling Company, but notwithstanding this fact, the season's profit was \$4,224,000, on a capital of \$5,760,000.

An Expensive Water Supply System.—Manchester, England, is not only celebrating the completion of the great ship canal, but is also completing a water system at a cost of \$12,500,000, the water being taken from one of the lakes in Cumberland, 95 miles away.

Enameling Steam Boilers.—A new invention is now being tested known as the enamel process for steam boilers. The inner surface is thinly coated with a smooth black enamel, which is said to prevent incrustation and prevent the usual action of acids on the boiler.

Great Pressure on Electric Light Bulb.—Those who have not made the calculations for themselves may be surprised to know that the pressure of the air on the outside of the bulb of a 2,000-c. p. incandescent lamp having a surface of 300 square inches is about 1 3/4 tons.

Army Suicides.—It has been shown by the statistics that the percentage of suicides in the German army as well as among German civilians is greater than in other European countries; equaling 6.33 per 10,000 in the army against 3.33 in the French and 2.07 in the English armies.

Seventy Miles an Hour.—A Lehigh Valley engine, No. 655, was recently turned out of the Buffalo shops and given a speed test that has satisfied the builders of the feasibility of maintaining an average speed of 70 miles an hour. In the face of a strong wind the engine was run at the rate of 82 1/2 miles an hour between Buffalo and Batavia.

Long Rails.—A test of the 60-foot steel rail has been made by the Norfolk & Western Railroad and as a result an order for a quantity of the long rails has been placed, the company paying a premium of \$2 a ton over the cost of 30-foot lengths. A large saving in expense of track labor has been demonstrated and something of a saving in wear of rolling stock.

Finest Steamboat Ever Built.—The new inland steamboat "Priscilla," built for the Fall River Line of Boston, by the W. & A. Fletcher Company, of Hoboken, R. I., is probably the largest and finest steamboat afloat. Her length over all is 440 feet, 6 inches; beam over guards, 93 feet; mean draught, loaded, 13 feet; displacement, loaded, 5,030 tons; maximum horse-power, 8,500.

Novel Form of Armor Plate.—Paul R. De F. D'Humy, of Chicago, is the inventor of a novel form of armor plate, which is soon to be given an exhaustive trial by the Government. Mr. D'Humy's plan is to present the edge of the armor plate, instead of its surface, to the projectiles of the enemy. Instead of being in one piece the plate will be composed of a number of 2-inch steel plates set on edge and bolted together.

Subterranean London.—To illustrate the extent of subterranean passage ways in London it is recorded that the new City and Waterloo Electric Railway line will, for a part of its way, run underneath the low level sewer, which is sixth-three feet below the street surface. First is the busy thoroughfare of Queen Victoria street, below this a steam railway, then the huge metropolitan sewer and beneath this, at a depth of eighty feet, the new electric line.

Italian Wines.—Italy is the first wine producing country in the world. During the years 1892-3 the grape crop was so abundant in Italy that in many districts there were not barrels and demijohns enough to hold the pressed juice, and cisterns were emptied of their water and filled with wine. The gross value of the crop equals \$231,600,000 a year,

while the grain crop is only valued at \$154,400,000. The value of the wine crop is one-sixth of the whole agricultural production of Italy.

* * *

Government Ownership of Railroads.—Now that the question of governmental control of the telegraph is so generally and persistently urged in this country, the experience of England in this respect is of more than passing interest. According to the last treasury report the expenses during 1893 footed up nearly a million dollars in excess of the receipts. Advocates of governmental control will, however, point to the fact of cheaper service and more general use by the people in partial recompense for the deficiency.

* * *

Average Number of Working Days.—The average number of working days in various countries is as follows: In Russia, 267; in England, 278; in Spain, 290; in Austria, 295; in Italy, 298; in Bavaria and Belgium, 300; in Saxony and France, 302; in Denmark, Norway and Switzerland, 303; in Prussia, 305; in Holland and North America, 308; and in Hungary, 312. One conclusion, at least, can be drawn from these figures, remarks Engineering of London—viz., that the number of working days of a country has nothing to do with its national wealth.

* * *

Production of Building Stone in 1893.—A report on the valuation of building stones produced in the United States during 1893, has been compiled by Dr. Wm. C. Day, special agent of the United States Geological Survey. It shows an aggregate valuation of almost \$22,000,000, a decrease of over \$13,000,000 from that of 1892. The valuation during the first half of the year was even larger than for the similar period of 1892, owing to pending government and private contracts. The large decrease which in the latter half took place is attributed to the financial depression.—*Stone*.

* * *

Process for Coking Dry Coals.—Mr. G. C. Hewett, Washington, is the inventor of a process for making coke from dry coals and lignites. Mr. Hewett holds that the failure of the many processes for making coke from non-coking coals was caused by the premature evolution of gases during the heating, and that there is consequently no opportunity for the coal to cake. His invention consists in bringing about certain changes in the constitution of non-coking coals by heating them at a low temperature under pressure, and there by giving them the property of caking and then coking them by the ordinary process. In his process the coal is first reduced to a certain degree of fineness, and then subjected to a gentle heat under pressure greater than 24 inches of water. After the coal has been heated sufficiently to bring about the proper changes, the coking operation is continued by any one of the ordinary processes.—*Age of Steel*.

Aluminum Shoe Heels.

Residents of cities, where brick and stone sidewalks prevail will be interested in the novel invention of Mr. M. W. Allen, of Eldon, Mo. He proposes to substitute aluminum for leather in building up the heels for boots and shoes. The advantages claimed for this invention will be apparent to manufacturers of boots and shoes. The durability of aluminum coupled with its extreme lightness makes

Fig. 1

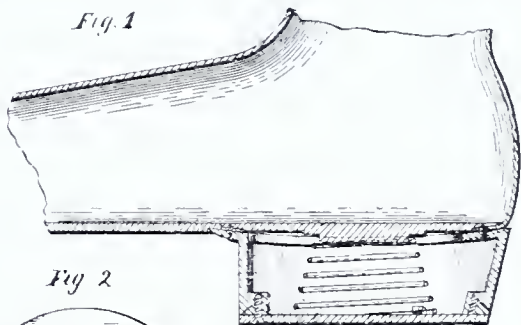


Fig. 2

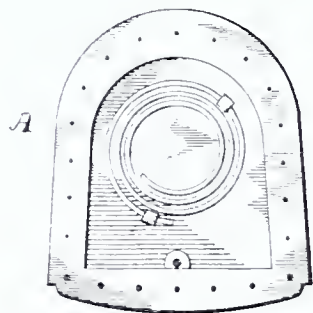


Fig. 3



A

its use desirable over other metals. The heel consists of a hollow shell having surrounding walls, provided with an inwardly extending flange about its three side walls, and a forwardly extending flange, projecting from its front wall on its upper edges, and extensions on its lower portions, and a

bottom plate detachably secured to said extensions and having lugs formed on its upper face portion, a coiled spring connected by its lower coil to said lugs, in combination with a yielding insole having a circular projection on its lower face, with the upper coil of said spring inclosing the same, as shown in accompanying illustration. As will be noticed the coil spring is so adjusted as to form a sort of cushion for the heel of the person and all jar incidental to walking is overcome. With aluminum there would be no such thing as "run-over" heels and the life of a pair of shoes would be greatly prolonged.

A Warning to Inventors.

Notwithstanding the warning to inventors constantly being given by THE INVENTIVE AGE and other technical magazines against swindling Patent Brokers, Patent Agencies, Patent Exchanges, Patent Investment Companies and the like, complaints are constantly coming in from inventors who have been victimized.

No sooner is the "list of patents granted" issued by the government each week than each inventor is besieged by a flood of circulars and letters setting forth in glowing terms the great worth of the invention—if properly handled—and offering gratuitous advice as to the manner of disposing of or developing it. Nine out of ten of these so-called Patent Agencies are fictitious and fraudulent. The managers have no idea of making a bona fide sale of a patent but figure merely upon the first advance fee of \$20 to \$50 for "expenses, advertising," etc.

One of the boldest schemes of the kind that has come under the notice of the authorities is that of the "American Patent Exchange," headquarters at Chaffee, N. Y., George B. Smith manager."

This swindler offers, among other facilities possessed for the disposal of patents "on commission," to insert an advertisement in "The Inventive Age," which he claims is "a magnificently illustrated magazine published to a vast circulation from the home office at Chaffee, N. Y." Knowing the reputation and standing of THE INVENTIVE AGE, Washington, D. C.—the only legitimate magazine by that name in the world—this name is used for the purpose of misleading the inventor and causing him to believe in the reliability of the so-called "Patent Exchange." While letters addressed to Smith may reach him, it is doubtful if a personal interview could be successfully arranged.

Generally these swindlers make an alliance with some clerk in the postoffice of some obscure town, or suburb, or with the postmaster himself, and thus the government is made a party to the swindle, as was the case of Willis and Bell, arrested at Sigourney, Ia., recently, by Postoffice Inspector Mercer. Frequently the name is changed so that while one month it may be "Chas. B. Smith, Chaffee, N. Y.," the next month it may be "Paul James Gregory, Marilla, N. Y.," while one month it may be called a "Patent Brokerage" business, the next month it may be called "Patent Exchange," or both and more aliases may be used at the same time. One concern may claim to publish the "Inventor's Bulletin," another the "Patent Record," and another, as in the case of Smith last month, may claim to publish "The Inventive Age."

Inventors should beware of these fraudulent concerns, and readers of THE INVENTIVE AGE can assist in ferreting out fraud and bringing guilty parties to justice by sending us such documentary evidence as they may receive from time to time from alleged Patent Brokers. THE INVENTIVE AGE is published in the interest of inventors and in that field will do all in its power to expose fraud and prevent imposition.

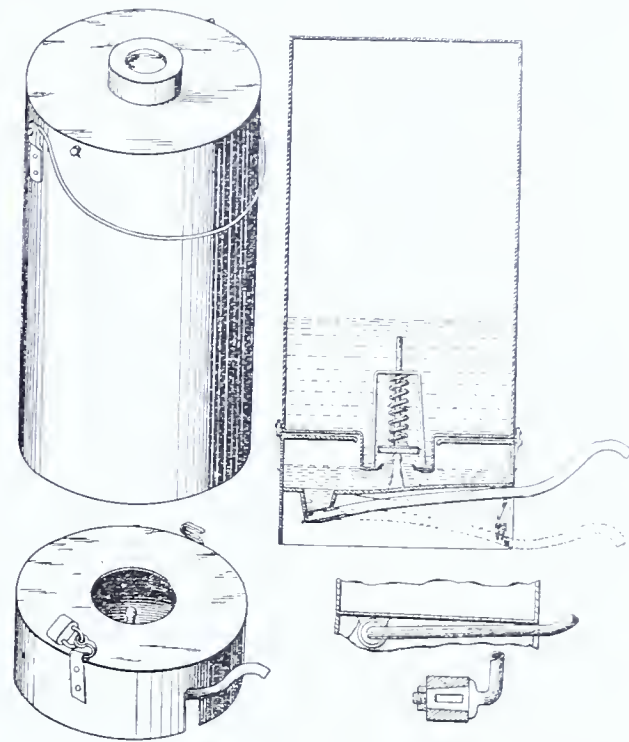
That \$50,000 Prize.

Recent development regarding that \$50,000 prize offered last March by the Metropolitan Traction Company for an underground electric road suitable for New York city lead us to think that the offer was not made in a sincere spirit. Prize offers of this kind should be accompanied by a certified check. Prizes offered for professional work are seldom satisfactory to either party. Such legislative action has been taken that it appears probable that none of the competing architects will get a cent for their labor.—*Electrical Review*.

It is announced that as one result of the recent investigation of armor-plate frauds at Carnegie's, the board will recommend that "in future mechanical engineers and not sailors be selected to inspect government material," the inspector having been, up to this time, mainly by ensigns who have returned from sea voyages.—*American Machinist*.

Discharge Attachment for Oil Cans.

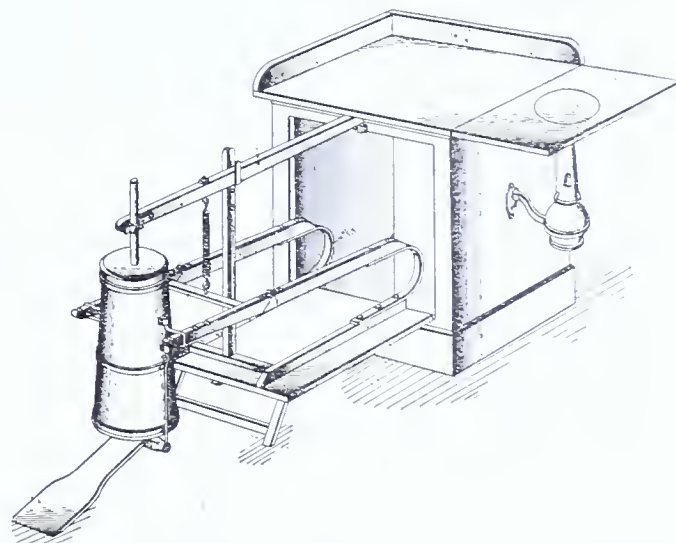
Illustrated herewith, is a novel invention in the way of "Discharge Attachment for Oil Cans," the result of the genius of Mr. W. Matthews, of Alameda, Cal. The object of the invention is to provide a simple device to which cans containing oil or other liquids may be applied, so that the liquid can be drawn from the can in any desired quantities until the supply is exhausted. The claim made by the inventor is that, while valuable for many purposes, it is especially applicable for the retailing of coal oil and gasoline. Its simplicity, proof against dripping, or getting out of order, combined with moderate cost of manufacture makes it particularly desirable for the purposes enumerated. The inventor desires to dispose of all United States rights, except the



Pacific coast states, he being fully engaged in working them himself. The inventor can furnish working model to bona fide investigator. The operation of the can is very simple. The can holding the oil is inverted and is provided with a base with flexible bottom to which a tube is attached, held in place above the line of oil by a spring. When the oil is drawn off the tube is simply pressed downward. The cut gives a clear idea of the mechanism. For full particulars address, W. Matthews, the inventor, Alameda, Cal.

Combined Kitchen Cabinet and Churn.

Messrs. Josiah K. Hodges and Theodore C. Dickson, of Cheyenne, Wyoming, are the inventors of a novel piece of kitchen furniture adapted to serve the purposes of the usual dough-board and which also contains a foldable churn mechanism, so that when not in use the churn may be swung inside out of sight. The illustration herewith shows the cabinet open and the churn in position for operating. It will be noticed that in the churn working device the churn is worked up and down, the dasher remaining



stationary. A device at the bottom of the dasher whirls the cream and prevents "splashing" out of the top of the churn. The churn can be worked either by foot treadle or by hand. It is claimed that the mechanism works so easily a child can operate it. In a test a little girl but five years of age churned seven quarts of cream in 9½ minutes. The inventors desire to sell state rights for the manufacture and sale of the cabinet, and invite correspondence with reliable parties in relation to the matter.

Procedure in Patent Cases.

By RICHARD HENRY GATLING.

[Read before the American Association of Inventors and Manufacturers at Washington, D. C., January 16, 1894.]

GENTLEMEN: In opening my address, permit me to express my pride and gratification that for three successive years you have made my father, Dr. R. J. Gatling, the President of this Association.

Not every inventor possesses a correct knowledge of the proper procedure in patent cases. Some one has said that the best is none too good. It is well to remember this in selecting an attorney or solicitor for taking out a patent. If the inventor realized the benefit of securing the services of an expert, he would select the co-operation of a solicitor who has had long and thorough experience in this line. The inventor frequently suffers in securing a lawyer of little information in regard to this work. He should use care in selection, even among the best attorneys. In New York City, as elsewhere, there are many firms doing an extensive patent business who cannot be safely trusted to take proper care of the inventor's rights. Some of these attorneys are so lacking in moral convictions that, in receiving an application for a patent from a rural inventor, they will attempt to secure any kind of a patent whether it conforms to the inventor's ideas or drawings, or not. The specifications prepared by such an attorney are drafted with the purpose of securing a patent at as early a date as possible, but without regard to maintaining any claims which the inventor himself may particularly desire or insist upon. A patent is secured, but it is not a patent for the machine or article which the inventor desired should be protected, and frequently he is unable to recognize his invention as set forth in his patent.

The first care of an inventor should be to have a good and strong patent to protect his invention. There is no sympathy for the inventor in the business world, for the viciousness exercised in business methods permits an advantage to be taken of the inventor whenever an opportunity offers.

The inventor in manufacturing the article patented will find his sales limited unless the patent protects the invention in every possible way. Other people would certainly manufacture it and sell it, and in case of an infringement, it is only a strong patent with broad claims that amounts to much when being forced to stand the severe investigation experienced in passing through an extended sea of litigation. A good and strong patent is of as much value to the inventor as the invention itself; for, if the invention be not properly protected, it will amount to little as a piece of property.

In the daily transaction of business men become careless of the strict and well-turned rules of business and sometimes neglect to embody in contracts or other legal papers, clauses or words which bear upon the subject matter with almost vital importance. Such oversights when made by the inventor too often prove disastrous, especially when the other parties to an instrument are unscrupulous. Taking things for granted, in the business world, more generally leads to detriment than to good.

If the inventor understands this he will, with watchful anxiety, take pains to properly secure his patent so that at least he may start correctly and be in a position to successfully fight the infringement which may be made, and which would otherwise work as a destroyer of the value of his patent. For this reason a few rules or suggestions are here given concerning the correct procedure in drawing up the papers necessary to secure a patent.

The first thing to be considered is: are you satisfied that you have something novel or new? Unless you are it will be useless for you to appeal to the Patent Office as is seen from the following declaration:

"A patent may be obtained by any person who has invented or discovered any new and useful art, machine, manufacture or composition of matter, or any new and useful improvement thereof, not known nor used by others in this country, and not patented nor described in any printed publication in this or any foreign country, before his invention or discovery thereof, and not in public use nor on sale for

more than two years prior to his application, unless the same is proved to have been abandoned."

The inventor having satisfied himself that his invention can be patented, his first steps are as follows:

A competent solicitor should be employed.

The Patent Office will not assume any responsibility for the acts of your solicitor.

To properly endow his solicitor with authority the applicant must give him a written authorization or power of attorney which must be filed. This written instrument must when given to a firm of lawyers contain the names of all the firm whether they are in power to act or not.

If the inventor is not satisfied with his attorney, he may revoke at any stage of the proceedings his authority. This action, however, can only be taken with the approval of the Commissioner of Patents; but when done another solicitor or solicitors may be chosen.

Should the inventor die the application can be made by, and the patent will be issued to, his executor or administrator. Should any assignment of the interest in a patent be transferred at the request of the applicant, the patent may be issued to the assignee; or, if only a part interest be assigned, the patent will on a like request issue jointly to the inventor and assignee.

The assignment must be recorded in the Patent Office within three months from the date of execution, otherwise it will be void against a subsequent purchaser for a valuable consideration and without notice of the fact.

The application for a patent and the accompanying oath must be signed by the actual inventor. Should the inventor be dead the application may be signed by the executor or administrator.

Joint inventors must have a joint patent. It is impossible for either of them to obtain a patent for an invention jointly made. Inventors who create independent and distinct improvements in the same machine cannot obtain a joint patent for their separate inventions. Even if the necessary money to take out a patent is furnished by one person and another makes the invention, they cannot have a patent as joint inventors.

Dealing with foreign governments will not prevent the inventor from receiving a patent in this country, unless the article shall, for more than two years prior to the filing of the application, have been introduced in the business world here.

This rule, however, prevails, namely: that every patent granted here, which has been previously secured by the inventor in another country, is so limited here as to expire at the same time with the foreign patent.

In drawing up the petition, which is considered the first paper necessary, the applicant must address the same to the Commissioner of Patents; give the name and residence of the petitioner and designate by title the invention sought to be secured.

It must also contain proper reference to the specification with a full disclosure of such invention, and all this must be signed by the applicant.

The specification, a very important factor in all patents, is a written description of the invention or discovery, and should be prepared with care. It contains in detail a technical description of the manner and process of making, constructing, compounding and using the invention or discovery, and its value depends upon the full, clear, concise and exact terms employed in describing the invention or discovery, so that any person skilled in the art or science to which the invention or discovery appertains, may be enabled to make, construct, combine and use the same.

The specification, if properly made and if it is to be of any value whatever, must set forth with the greatest precision the invention for which the patent is desired.

The principle must, of course, be fully explained and the applicant should state the best mode in which he has contemplated applying that principle, in order to distinguish it from other inventions.

Concerning an improvement, the specification should be drawn so as to particularly point out all parts to which the improvement may relate and in plain language select or distinguish between what is old and what is thought to be new.

The drawings and all other descriptions, as well as the claims, should be confined to the improvement alone and such other parts as necessarily co-operate with or concern it.

All practice makes it necessary that the specification should conclude with a specific and distinct claim or claims for the part, improvement or combination which the inventor thinks to be his invention or discovery.

Too much attention cannot be given to the drawings which should accompany every application for a patent. Where the specification is abstruse and ambiguous, good drawings will enable the examiner to grasp the idea and understand the claims in the specification.

This suggestion that all drawings should be prepared with care is urged by the Patent Office itself.

The various views of the drawings are indicated by figures, but their different parts are generally designated by letters, they being preferred to numerals.

The specification must be signed by the inventor himself if alive, or by his executor or administrator if he be dead; and the signature must be attested by two witnesses. Names should be given in full and it is asked that they be legibly written.

In making an oath the applicant, should he be the inventor, must affirm that he does veritably believe himself to be the original and first inventor of the article in question; that he has never heard of the same before and believes it was never used, and must state his residence and name the country or state of which he is a citizen.

Under other prescribed circumstances oaths must be taken, but they are not of enough importance to speak of in detail.

Oaths or affirmations can be made before any person in the United States duly authorized to administer oaths, or in a foreign country, before any minister or consul holding commission under our government.

Drawings are signed by the inventor, or his name may be signed by his attorney in fact, and these signatures are attested by two witnesses.

Drawings show every feature of the invention covered by the claims.

When the invention is of an improvement on an old machine or article, the drawings should illustrate the old invention with improvement attached thereto.

The drawings should be prepared under the inspection and made entirely from the suggestions of the inventor; and in most instances they are prepared by experienced draftsmen who understand the rules of the Patent Office governing such work. Hence the details, such as the size and kind of paper, the number of drawings, the surface of the paper and the particular ink used with the various kinds of lines, the draftsman generally knows by heart and it is very rarely that any serious mistakes occur from this part of the business, that is, if the solicitor has used proper care and exercised due diligence in drawing up the specification and making clear and broad his claims.

In a case where a model is necessary, the applicant will be so notified by the Patent Office. Should the model be desired, it must show plainly all points desired to be covered by the patent, and a little more than usual care should be exercised to make it perfect in every detail, and generally it should not exceed in dimensions one cubic foot.

If the model is not placed on file it will be returned to the inventor, and when it is required no examination of the papers will take place until it shall have been sent to the Patent Office and placed on file.

It has for a long while been the rule that could a model be made of metal it would be so preferred. Should, however, the material form an essential feature of the invention, the model then should be made of that material.

The model, like the drawings has its prescribed dimensions, except in cases in which the Commissioner of Patents shall desire it otherwise. For instance, it may be that the machine itself might be used as a model, and if such is the case the usual dimensions for the model will not govern.

Other details are such as if the model be made of wood, it must be painted or varnished, that glue should not be used, that the parts should be so made as not to be effected by any action of heat or moisture.

All these details are understood by the experienced model maker. Should the invention or discovery pertain to a composition of matter, the applicant, if asked by the Commissioner, must furnish specimens of the material or composition, and the ingredients of which it is composed in sufficient quantities for the purpose of experiment.

When the application with the necessary papers, drawings and model, if required, are in the Patent Office, the examination is the next step necessary in securing a patent. The examination, however, is out of the inventor's hands and he must await the result of it before realizing whether he is to meet failure or achieve success. Applications after being filed in the Patent Office are classified according to the various arts, and, in most instances are taken up for examination in the order of their filing. If the inventions pertain, or are peculiarly important to some branch of the public service, or promise a benefit to any governmental department, they are, as a rule, acted upon immediately, and the examination completed at as early a date as possible. In most all other instances the application takes its regular course in the order of its filing.

The first step in the examination of an application is to determine whether it is made in proper form. Other than formal objections are not, as a rule, seriously considered. Nothing, however, can be done until formal objections are disposed of.

An applicant for a patent, some or all of whose claims have been rejected by the examiner, may appeal on his original papers from the decision of the examiner to a Board of Examiners-in-chief.

Three examiners compose this board who are chosen for their superior mechanical and legal knowledge, and are appointed by the President of the United States.

This board carefully examines the application, and in support thereof the applicant's attorney may submit oral or written arguments, after which the examiner's decision may be reversed or affirmed.

Should the decision of the Board of Examiners reverse that of the examiner, the application will be allowed and the patent issued on payment of the necessary fee. Should, however, the decision of the examiner be affirmed, the inventor may, if he still thinks his invention patentable, appeal to the Commissioner of Patents in person, but for this step he must pay another government fee. Should the Commissioner in Chief reject the application the inventor may appeal to the Supreme Court of the District of Columbia under special rules governing the jurisdiction and practice of that court.

When an application is rejected by the primary examiner the applicant is so notified, reasons for the rejection being fully and precisely stated, and such information given as may be useful in helping the applicant to judge what course to pursue in further pushing his application, or in changing his papers; and if after getting due notice of rejection, he desires to push his claim further, he moves in the channel above indicated and takes an appeal with or without altering his papers.

When rejections occur which may be cured by formal alterations in the papers, affidavits in contradiction or in explanation may be submitted to the examiners by the applicant or other person or persons interested in the invention. The applicant, however, after receiving notice of the first objection to his papers often does well to amend them, which he may do as frequently as the examiner or Board of Examiners presents new reasons for rejection. The applicant should clearly designate all the patentable features which he believes his case presents, in view of the state of the art disclosed by the references used or the objections made.

It is at this stage of the business that the experienced patent lawyer is able to help the inventor out of his difficulty. In such a situation it often happens that only the delicate touch of the solicitor, secured by long experience, saves the value of a patent.

As to amendments touching the merits of an application or as to cases where conditions arise involving interferences, thus necessitating a vast amount of testimony and evidence, and proceedings which resemble a law suit; or as to the complications which sometimes arise in the conduct of appeals following rejections, there is neither space nor time for discussion, for these fields are vast and abstruse.

The patent solicitor is sometimes asked to secure an extension of a patent. After the patent has run for its statutory time, seventeen years, the original patentee, or any owner of the patent may feel that for various legitimate reasons he should be entitled to an extension of the protection that the government gives him under his first patent.

Extensions, however, are not granted as frequently as in the past, owing probably to the fact that our people now feel that a protection of seventeen years is a sufficient reward for the government to allow the inventor for the blessing which his genius confers upon the world.

It may be fairly said that the patent laws of the United States are the best that were ever enacted, and to the people of this country give liberty and opportunity for invention greater than were ever enjoyed by any other people. They are generous and broad, and in being so permit the genius of Americans to excel and surpass in many respects the achievements of the foreign world. Founded in those relations of justice, which to the mind of every man bring encouragement and give to him that protection which his work and labor rightly claim, they stimulate an advancement, the equal of which is beheld in no other land.

Within the walls of our own famous Patent Office exist the successes which have made fortunes for some and spread happiness in homes in this and in distant lands; but from this institution many have turned away in sorrow and disappointment, under which multitudes of unsuccessful inventors have been crushed to earth. Like an old battle field the Patent Office means triumph and glory to the victor, but for the vanquished it suggests nothing but mortification and sorrow.

The marked achievements of mankind born of their intelligence and genius are deposited in the archives of this institution in probably larger quantities than in any other edifice of the world. The applied science of the world in all that it implies could not have developed to that high state witnessed by the present civilization unless the inventor and the Patent Office had worked hand in hand.

The Patent Office has been a generous and helpful friend to thousands, for it has assisted inventors from every part of the world on the road to success, guiding them through the vestibule of effort into

the gilded halls of fame and fortune.

In creating the Circuit Court of the United States, this government further strengthened the laws which aid and assist the inventor, for that court in its jurisdiction acts as guardian and bestows, when the occasion requires, a rigid interference on behalf of the inventor. As a human legislator it sanctions the patent right and condemns infringements, and as a penalty it chokes off the aggravated and outrageous crimes injuring the property in the inventor's patent. If the inventor's product is to serve and support him, it must be guarded with jealous care and not be stolen by agencies that seek to defy the law. To this end the Circuit Court directs its efforts when appealed to on behalf of the inventor. It is at the door of this court that the patentee must apply when he seeks a remedy against an infringement of his patent.

From the Circuit Court of the United States an appeal may be had to the recently established United States Circuit Court of Appeals. From this court the inventor may still further appeal to the Supreme Court of the United States which sits in the city of

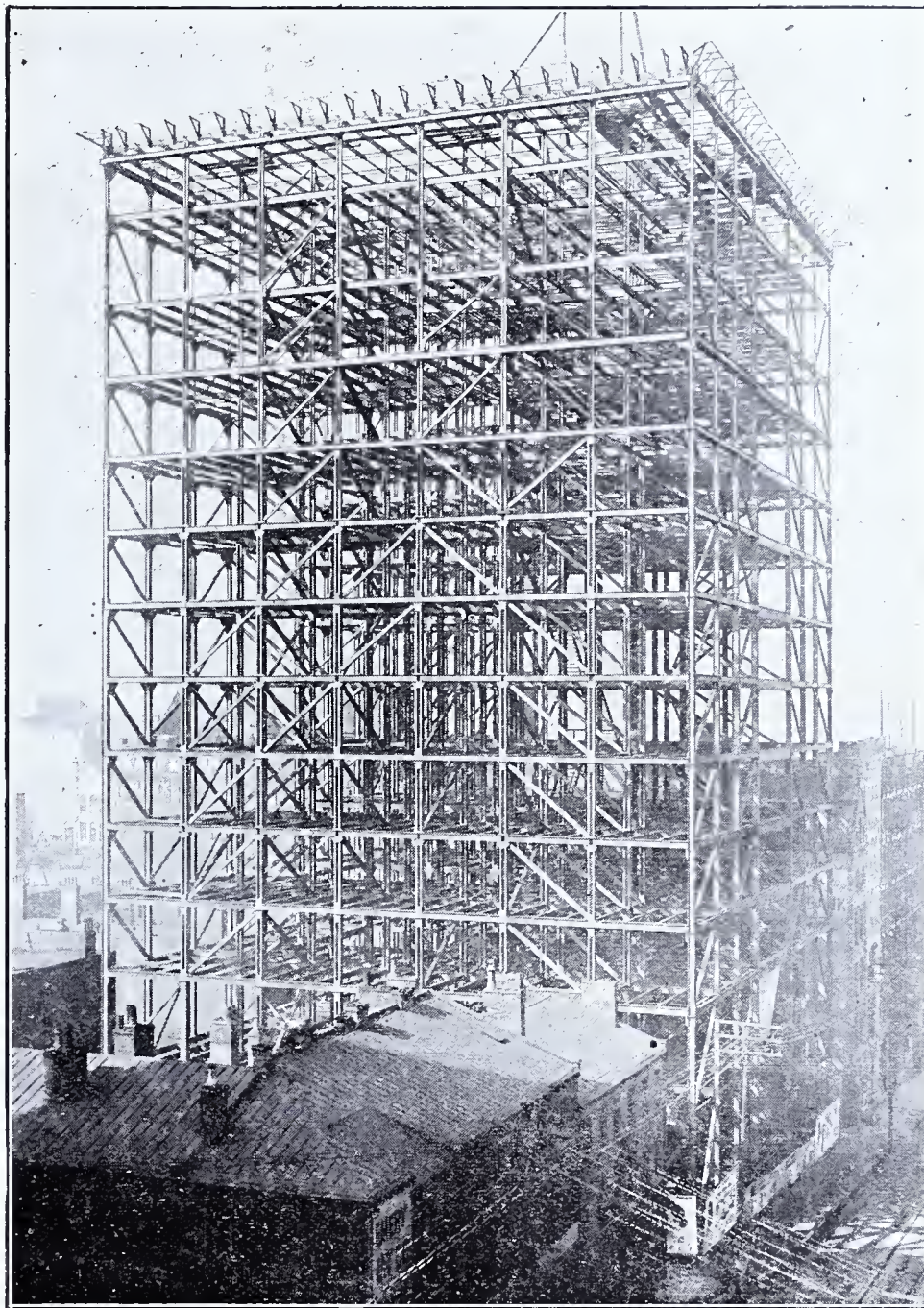
Modern Office Buildings.

A few years ago only a massive pile of stone and brick—heavy walls interior and exterior—was considered a fire-proof, model office building. Six and eight stories was the maximum height and, as compared with the cost of office buildings as now constructed, required a fabulous expenditure. What a revolution in engineering and architecture as applied to building operations, has taken place during the last few years. With her characteristic energy and boldness Chicago took the lead in building these modern "sky-scrapers," but in all the larger cities the tall, steel-frame, office building now finds favor. By the use of modern fire-proof structural material office buildings are now run up, ten, twelve, seventeen, and even twenty stories or more, and through modern rapid and safe elevator service, the upper stories frequently bring higher rents than the lower stories. These buildings are absolutely

fire-proof, no wood, other than the doors and casings, being used in their construction.

The view given herewith is from a photograph of the steel frame of the new Carnegie structure in Pittsburgh, now nearing completion, and illustrates the manner of building. It will be noticed that all the steel structural work was completed before a brick or stone was laid. A feature of this modern engineering triumph is the fact that each story in some of these buildings is self-supporting. That is, the steel frame of each story sustains the weight of the outside wall. Thus it is possible—and is frequently the rule as those who were in Chicago last summer will have observed—to prosecute the laying of the outer walls from several stations, simultaneously. While the first three or four stories are being faced with stone, it is possible for the brick layers to work upon the upper stories at the same time. Iron Trade Review for January contained a lengthy description of the Carnegie building.

Chicago, because of its high buildings, has been called the city of sky-scrapers, but, acting on the advice of property owners who were opposed to the centralization of business, the city council of that city placed a restriction on the height of buildings, and now none above twelve stories are being built. New York has not yet enacted re-



CARNEGIE BUILDING AT PITTSBURG.

Washington. After the inventor has passed through the channels of relief which these three courts in their power of equity and law afford him, he may feel assured that he has been fairly dealt with concerning any difficulty arising from infringement and thus injuring the property under his patent.

This Association was organized to protect the rights of inventors. May it always be its desire and purpose to do so. By using carefully the means that our correct laws afford, the inventor should be in a position to guard the privileges which this government has wisely decreed him. Our laws are now foremost for their equity and moral correctness and fairness, and as expounded by the various courts of this land, they provoke the exultant exclamation that a just and wise law is a blessing as extensive as the dome of Heaven, and bespeaks the highest wisdom of an intelligent people.

A high tower is to be constructed at Fredericksburg, a suburb of Copenhagen, by Colonel Somefeldt. It will be 600 feet high. The Danish Minister of War has reserved the right to use the top as a military observatory.

strictive ordinances in this respect and a large number of these cloud-piercing edifices are now being constructed. Those under contract for this season include one ten stories, one sixteen, two twenty, and one twenty-four stories in height.

Mr. J. McCook in American Charities Review, gives the result of his extensive investigation of the tramp question. He has found that fifty-seven per cent of our American tramps have trades or professions; forty-one per cent are unskilled laborers. Ninety-eight trades were represented by the 1,349 individuals—and nearly half of the persons belonging to these were attached to employments which require constant locomotion. What makes people tramps? The question designed to throw light on this was, "Why did you take to the road?" And, of course, most of them attributed it to their being "out of work"—eighty-two and eight-tenths per cent in fact. A few were "tired of work," or "wanted to take life easy;" still more wanted to see the country;" more still charged it to "drink," a few to "roving disposition," and a very few to "won't work."

NEW MECHANICAL MOVEMENT.

Solution of the Third Conversion of the Linear Reciprocating Motion Into Rotary Motion.

The mechanical movement, described in patent 481,409 (1892), is the solution of the third conversion of linear reciprocating motion into rotary motion. This invention, made by Peter Felix Meny, of Elizabeth, N. J., is one of the most novel conceptions in the line of mechanical movements. It is the diametrical conversion known in the scientific world as "Quadrature of the Circle," and is the appliance of Pythagoras' teaching on the propriety of the squares formed on the sides of a rectangle applied to mechanical movements, the pressure being set on the hypotenuse which leads the crank representing the short side; while in actual movements the pressure is applied directly or by means of a connecting rod to the crank. They are either radial or tangential.

The inventor, born in 1839, is a native of Thann, Alsatia, where he learned the trade of mechanical

pin and roller I, of the crank H (Fig. 2). On the main shaft J in the rear of the crank is fixed a cam moving a lever fixed on rod Q. Another lever P on said rod (Fig. 3) imparts the timing of the cam to the plate O, whose grooves N regulate the pins L, fixed in keys K.

At the start both levers HH¹ engage the crank, but the key K being off its wing D, the lever F is at the momentum free from the pressure. Its wing will give and allow the crank pin to lead the lever H¹ upwards, leave its slot H² and enter the open space H⁴. The pressure will set its power on the lever F¹ whose wings are closed. The crank stands under the lead of the lever H¹. While going further the pins L slide in their inclined groove N, compelling the key K to close its wing D, while K² slides off D² allowing the crank at the end of its travel the same freedom it had at the start and it will bring the lever H in proper position to lead upwards. The time cam on the main shaft will move the plate O, reversing the angles of its grooves, closing the key K² and opening K³, regulating their wings for the upward stroke. All these movements are short and positive without interfering with the power or the speed, as they regulate only the negative side of the movement.

The machine is compact and occupies but little

space per square inch on the area of the piston, the value for one stroke is equal to $12 \times 100 = 1200$ inch lb. The mean pressure on the crank is 64 lbs. These values in the new system will become

$$\text{speed} \frac{12 \times 100 \times 1.57}{1.57} = 1884$$

and that speed which is the product of less time makes the value of pressure on the crank radius equal to the 100 lbs. of the stroke of radial conversions, taking a time equal to 1.57 longer. And while now one stroke, equal to 1200 is made, there will be performed 1.57 strokes equal to $1884 \times 1.57 = 2.957$. As the hypotenuse F and the lever H retain their entire value on the in and outlets, the cut-off will be set at a quarter stroke instead of one-half, so the same amount of pressure or feed used now for one stroke will perform two strokes. There will be a net gain of power of at least 120 per cent.

At the in and outlets the length of the hypotenuse F for a 12" stroke is 8.484. Being inclined at an angle of 45° its value as sinns is 6" receives 100 lbs. pressure, which for the length of 8.484 will be 70.7 lb. The length of feed and time taken by the stroke to forward the crank a distance A is B which is equal to half of the time and feed used by radial conversions to travel said distance A. The lever H makes the double speed of the stroke on the radius of the crank and its value is

$$\text{Pressure, } \frac{1}{2} \text{ circle. Speed, } 8.484 \times 70.7 \times 1.57 \times 2 = 1884$$

The theoretical length of the 6" crank at 45° = 4.242 or one-half the length of its lever H, which represents its diameter and its value equals

$$\text{Pressure, } \frac{1}{2} \text{ circle. Speed, } 4.242 \times 70.7 \times 3.14 \times 2 = 1884$$

The crank for 6" length has 50 lb. pressure corresponding to the half amount of feed of the stroke taking one-half time for the travel of the crank which makes double speed compared to the time and speed of the actual movements.

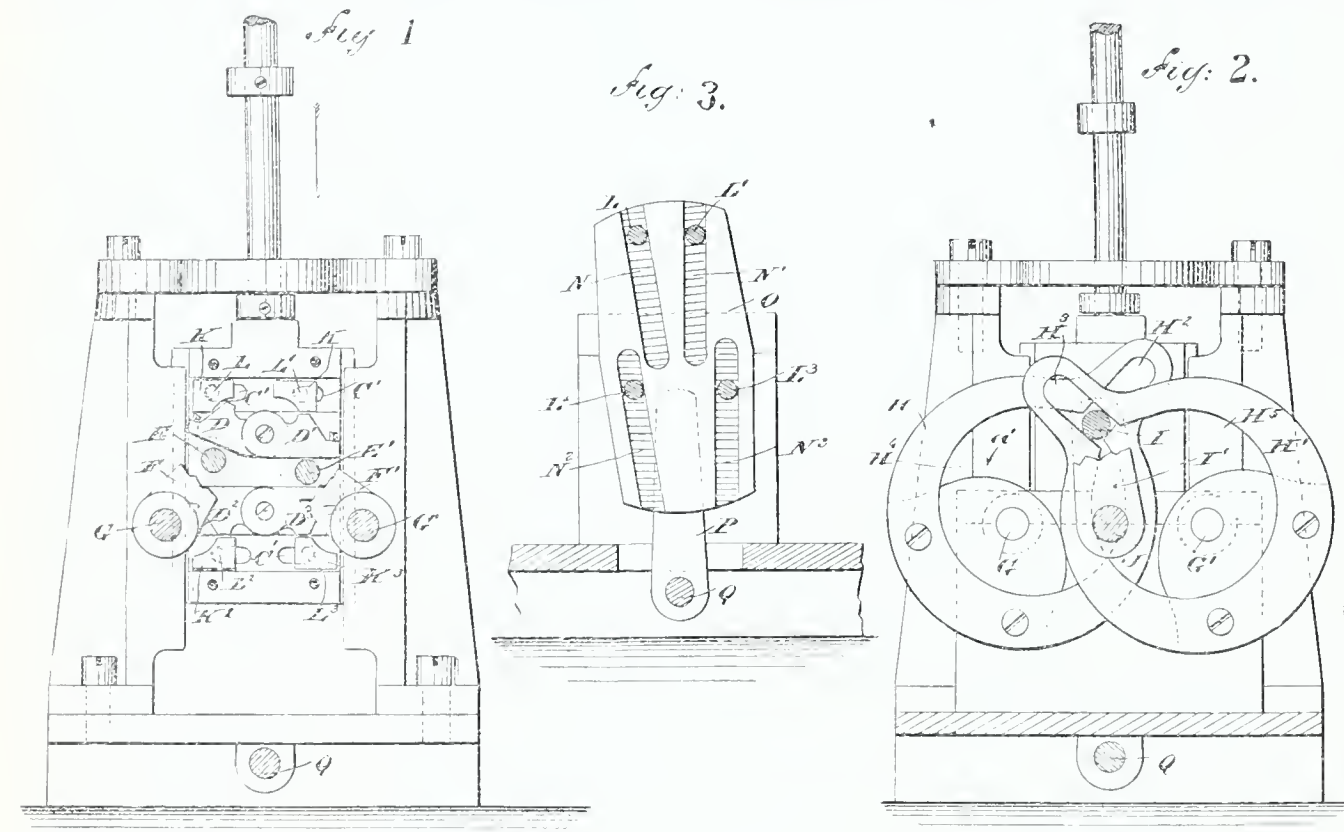
At the middle of the stroke the lever H, being the diameter of the crank, has 12" length; its pressure is $8.484 \times 100 = 70.7$ lb., the same being uniform for all

12

the angles of the crank. The time and length of feed for the stroke to lead the crank a space A' is equal to B', or the 0.707 part of that necessary to actual movements for travelling the same space. The crank and its diameter makes 1.414 more speed than the stroke, so the crank attaining its full length, has more power and less speed at the middle stroke. Being technically shorter at the ends, it has less power and more speed. Its value in the middle is equal to

$$\text{Pressure, } \frac{1}{2} \text{ circle. Speed, } 6 \times 70.7 \times 3.14 \times 1.414 = 1884$$

It is to be considered: First, That the terms half time refers to less time, as one second is the one-half of two seconds; also half feed means the length of feed given by the travel of the stroke compared to the corresponding travel of the crank which is faster. In reality it is always the time and the entire feed of the cylinders which produces the half revolution. The feed is more evenly divided in relation to the spaces traveled by the crank and stands in correct relation to the time for the entire half circle. If the crank is theoretically shorter at the inlet, the pressure acting it has the full power at the end of the hypotenuse, while in actual move-



drafting in the concern of Mme. Vre. Andre, builders of engines and water motors. Having completed his five years' apprenticeship, he was engaged in the firm of M. M. N. Shlumberger & Co., a leading firm for the construction of machines for spinning textiles. There he had charge of the designing and supervision of the building of the Platt and Parr Curtis self-acting spinning frames for the different purposes for which they were to be used. He emigrated and came to New York in 1867, and since 1878 has been employed by the Singer Sewing Machine Manufacturing Co., where, under the management of M. H. Reiss, superintendent of the milling department, he drafted many automatic labor-saving machines for the production of different parts used in sewing machines. Knowing the want for a perfect rotary conversion to reach high and uniform speed, combined with power to be used for many purposes, he was convinced that it could only be obtained by making the same on the principle of the Quadrature. Having the knowledge and experience of years of work and study in the line of complex mechanism, he undertook the task of overcoming the difficulties of the problem, and after three years of trial and experimenting—1889 to 1892—he made the movement and invented the mechanism technically described herewith. The different cuts are copies of the model and Patent Office drawings. Fig. 1 represents the cross head, Fig. 2 the driving of the crank, and Fig. 3 the regulator of the movement.

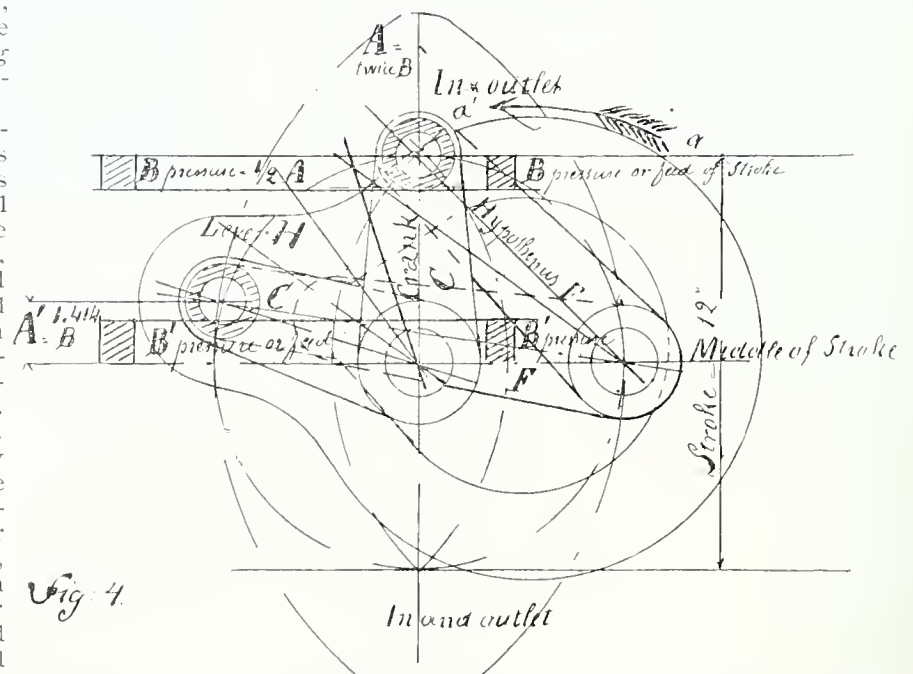
As in actual machines, this conversion is actioned from the pressure of a cylinder whose piston rod leads a cross head C, provided with two pairs of wings D and their keys K, slide in guides B (Fig. 1). The pressure is applied alternately to the levers F, whose pins and rollers E, lay between the wings D. Said levers F are fixed on their respective shafts G, bearing the levers H, whose end slots engage the

space. The parts, made of best steel, will be light. Taking their proportions into consideration, their function is positive, the swing for the wings and regulator being only 15°. The hypotenuse and drivers are oscillating; their rollers are subjected to circular friction, and are released from the pressure after each stroke, when they relieve one another. This conversion is nicer and easier than any in existence. But these advantages are of no value to certain of our engine builders, who cannot admit anything to be superior to links and connecting rods, which shall remain the intermediate for converting power.

The following diagram demonstrates and explains the advantages of this new conversion and gives its technical value compared to actual movements. As it has never before been clearly explained to the public, many will be attracted by its novel features. It is specially devised and presented to those who believe in scientific progress, and are competent to understand a genuine mechanical device and technical study.

The lever or hypotenuse F, (Fig. 1 and 4), being set in motion by the cross head C, transforms the linear travel of the stroke into oscillating motion of 90°. Another lever H transfers the same to a crank C, which makes one-half revolution with developed speed or a faster speed, as the stroke possesses, and their travel will be performed in a time equal to I. While in actual conversions the stroke is timed by the length of the half circle described by the radius of the crank, which is 1.57 times longer than its diameter or the stroke, consequently the pressure imparts its full power, even speed, which is 1.57 times faster than now even by using three connecting rods to all the angles of the crank.

For an engine of 12" stroke and 100 pounds pres-



ments with connecting rods, the pressure acting directly to the center, and the crank having no lever, the movement is powerless and is kept running only by the accelerated speed of the fly wheels. Second: The crank has always ten per cent more power, being the 0.707 of the pressure of the stroke, while in the machines with connecting rods it is only the 0.64. Third: Any resistance that is not overcome from a

power applied to a lever will give way when said power is attached to a longer lever. The hypotenuse leading the crank is the long lever driving a shorter one. The latter transforms the power of the stroke into speed, which speed is a prime, being not produced as by gears or pulleys, but made in the movement itself by the stroke, whose linear speed is uniform. Not being delayed, it leaves the power its full energy which is fifty per cent more effective than in the actual conversions, and the half revolution of the crank will be performed in the 0.64 of the time the best engine needs now.

The consequences of the above are: The diametrical conversion being a power motion producing a rotary movement, where the entire value of the pressure (taking the developed speed and shortness of time into consideration), remains on the circle described by the radius of the crank. Therefore, it is a generator of power. This circular length being 1.57 times longer than the linear length of the feed, by adapting air pumps actuated from the crank shaft they will reproduce the unity of linear pressure by supplying the cylinder with compressed air taking the value of 1200 necessary to supply two strokes with one-fourth cut-off (as seen in diagram) leaving the value of 2400 for whatever use the machine is intended to perform.

This movement is the living, self supporting conversion predicted by science. It is not a perpetual motion producing power by itself without feed. It has a constant feed and a uniform developed speed. The pressure and speed are liable to be regulated as in actual machines. It can be stopped and started, also reversed at any point and at any time without any consideration for the position the crank has taken on the circle. When the supply of pressure is cut off, the crank will lose the acceleration of developed speed and will take its own circular time to revolve further. Having lost the feed and the advantages derived from it, the movement will stop at shorter notice than it does now.

The connecting rods pushing and pulling around and toward the center of the movement, their use is not practical for high speed and pressure and too often they fail. The cylinders explode and the parts are broken—something that happens even to locomotives with compound cylinders. Such accidents cannot happen in this conversion. Any amount of power and speed, the two being a unit in this movement, can be obtained. Ships using even less pressure will be able to travel with safety at a speed they will never attain with the present system. Many wants, impossible to be supplied now, will be filled. The air ship will be made practical by using the Quadrature movement, and it will furnish power and electricity, giving heat and light by the means of the same air which upholds the life of all living existence.

PETER FELIX MENY.

Cremation Forbidden by Catholic Priests.

According to the Catholic Citizen, Catholic priests refuse to conduct funeral mass for one whose body is to be cremated. The case in question was that of a woman whose husband had suddenly died in a foreign land, and who had obtained the promise from his wife that in case of death his body should be cremated and his ashes taken back to his native land. She desired the blessing of the corpse before the incineration. Before giving her a definite answer, the Ordinary was consulted as to what was the proper course to pursue under the circumstances. The answer from the Chancery came that the Catholic burial service could not be held if the condition of having the body cremated afterward were insisted on; the authority given was a decree of the Sacred Congregation, which prohibits Catholics from adopting this mode of disposing of the dead body.

Names of All Patent Attorneys.

There has recently been compiled by Virginia W. Middleton, the well known stenographer, a list of all attorneys practicing before the United States Patent Office. This little volume is of incalculable value to inventors, attorneys and manufacturers. The cloth binding costs \$1.50 and paper cover \$1. Send to THE INVENTIVE AGE, Washington, D. C. Edition limited.

Modern Triumph in Steamboat Building.

The excellence of modern skill in the building of steamboats in the United States is exemplified to a high degree in the new steel steamer "Priscilla," built for the Fall River Line passenger service between New York and Boston (Old Colony Steamboat Company). The "Priscilla" is the largest, finest and most luxuriously furnished steamboat ever built. She is a floating palace, designed and built under the personal supervision of Mr. George Peirce, Supervisor of the Old Colony Company, and is an important acquisition to this company's fleet of world-renowned palatial steamboats.

The dimensions of the vessel are as follows: Length of load water line, 423 feet, 6 inches; length over all, 440 feet, 6 inches; beam, 52 feet, 6 inches; beam over guards, 93 feet; depth molded at lowest point of sheer, 20 feet, 6 inches; mean draught loaded, 13 feet; displacement, loaded, 5,030 tons; maximum horse-power, 8,500.

The contract for the steamer complete was given to the W. & A. Fletcher Co., Hoboken, N. J., the builders of the machinery and boilers, and they sublet the various contracts for the hull, joiner work, painting and decorating, plumbing, etc.

The hull was built by the Delaware River Iron Ship Building and Engine Works, Chester, Pa., of steel, on the double hull, longitudinal cellular system, with a length of double bottom of 340 feet, having in all 52 water-tight compartments; besides which the hull is divided above the inner bottom and

the second class passengers 89 berths are provided and 155 berths for the crew.

The style of decoration throughout the greater part of the steamer is that of pure Italian Renaissance.

The quarter deck is very spacious, with a floor laid in marble mosaics. From the quarter-deck, the grand staircase leads to the main saloon. It is made of solid mahogany, with the strings of railing of wrought iron. Here, also, are the ticket office, barber shop, coat room and entrance to the dining room lobby. The walls of the quarter deck are finished with mahogany and ornaments and panels of paper mache, representing by groups of figures in low relief, commerce, arts and sciences, music and the dance. The principal features of the main saloon are its size, its richly decorated ceiling and forward bulkhead in relief of paper mache, the system of lighting from the dome, the beautiful electric features, the large and spacious staircase of mahogany leading to the gallery, with its strings of railing of handsomely wrought iron.

The dining room lobby is finished in mahogany and paper mache panels and is decorated in cream, white and gold. On the port side of the lobby a large staircase leads to the main saloon above. On the starboard side of the lobby a staircase leads to the men's saloon in the hold. From the lobby you enter the dining room, which is one of the greatest features of the steamer, and its size, grandeur and rich effect are at once evident. The style of decoration is purely "Indian," mahogany finished, and in all details the designs have been faithfully executed. On each side of the room are six large windows; between the windows are beautiful mahogany side-boards, with large, glass mirrors. In the lower part of the side-boards, fire-places have been built, and they contain the

radiators concealed by brass shields, forming a clever arrangement of heating the room. At the forward end of dining room are the cashiers' desk silver locker, coffee urns, and staircase to kitchen, and pantry below the deck. Both forward and after bulkheads have large mirrors, producing in effect a much larger room and a succession of mirrors and columns and a display of Oriental magnificence.

The vessel is fitted with 1,900 incandescent lamps of 16 candle power, each supplied by three multipolar, direct coupled, compound-wound dynamos, driven by horizontal "Ideal" engines, having cylinders 11 inches diameter by 12 inches stroke. The capacity of each dynamo is 400 amperes and 125 volts. Special care has been taken in the wiring of the vessel, and none but extra heavy wires with the very best fire and water-proof insulation have been used.

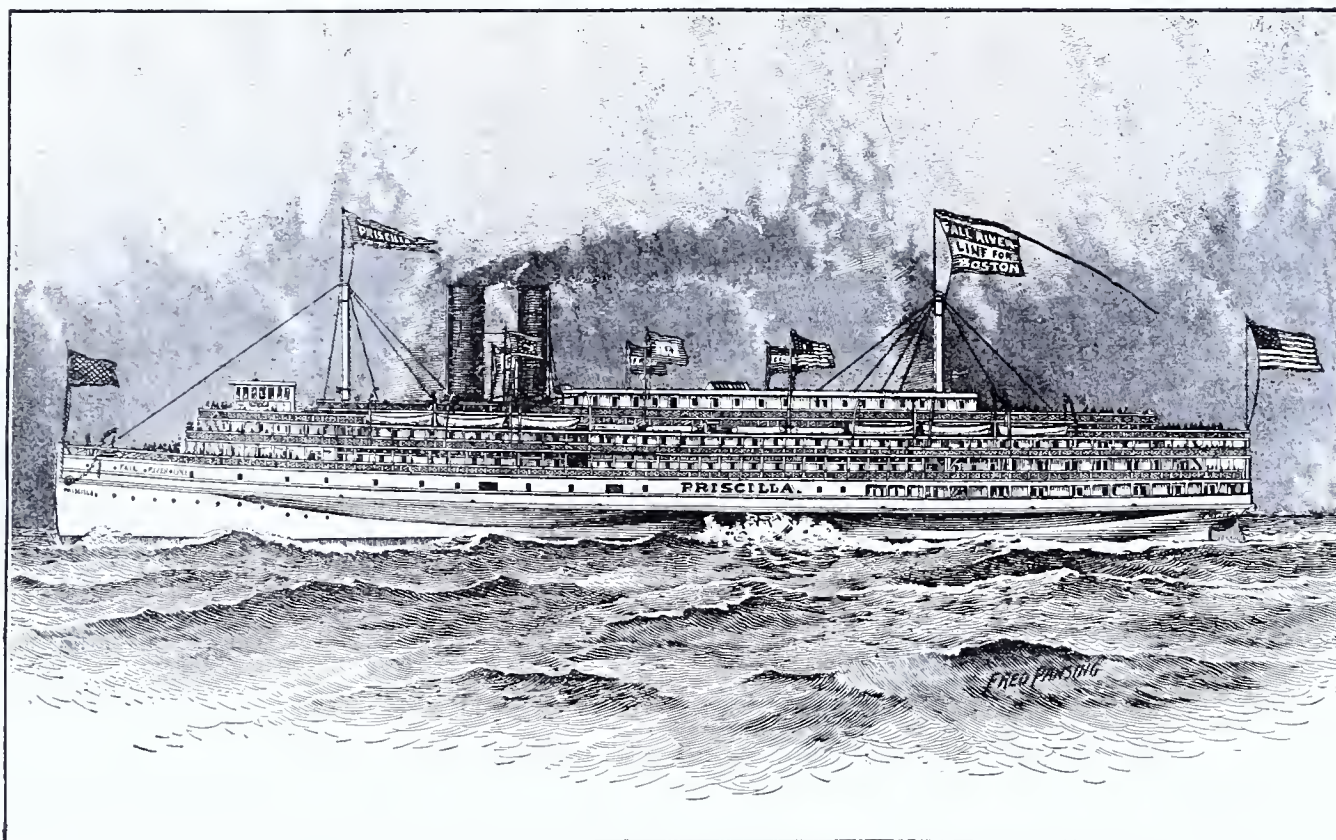
The steamer is fitted with a cold storage plant supplied by a 2-ton Allen Dense Air Machine.

A trial trip of the "Priscilla" was made last month, which demonstrated the perfect working of all the machinery to the satisfaction of the builders and the pleasure of 1,000 or more representatives and friends of the various firms engaged in the building.

The "Priscilla" will be taken at once to Newport to receive her outfit of furniture, carpets, hangings, bedding, linen, etc., etc., which have been contracted for direct by the Steamboat Company.

The illustration presented herewith was made from drawings especially for THE INVENTIVE AGE, through the kindness of Mr. O. H. Taylor, Asst. Gen. Pass. Agt., of the Fall River Line, New York.

The Dwight Machine Company of Connecticut are the makers of two machines capable of counting and binding in packs 500,000 postal cards in ten hours. The postal cards are printed and cut by another machine, but this one counts them and makes them into packs of 52 each. The most ingenious parts of the machine are the fingers and thumbs, so to speak, used in wrapping the narrow strip of paper around each pack. The paper is pulled off the reel by two long, slender fingers that come up from underneath; another finger dips itself into the box of mucilage and daubs the end of another finger, which in turn applies the mucilage to the narrow strip of paper at just the right spot. The strip is wrapped about the pack of cards, a thumb comes up and presses the mucilage part down hard and the thing is down.



THE NEW LONG ISLAND SOUND STEEL STEAMER, "PRISCILLA."

at ends of vessel, by means of bulkheads extending to main deck and by flats, into nine additional water-tight spaces, making in all 61 water-tight compartments. The construction of hull shows a most judicious use of material, great strength being obtained.

The main engine is of the double inclined compound surface-condensing type, of 8,500 maximum horse-power. There are two high-pressure cylinders, each 51 inches diameter, side by side, forward of main shaft, and two low-pressure cylinders, each 95 inches diameter, side by side, aft of main shaft, all having a stroke of 11 feet.

The paddle wheels are of the feathering type, 35 feet in diameter outside of buckets. There are 13 curved steel buckets in each wheel, each bucket being 5 feet deep by 14 feet wide.

The main boilers, 10 in number, are of the single-ended Scotch type, and were built for a maximum steam pressure of 150 pounds. This is far in excess of what will be required for the usual business of the steamer, but is advantageous in permitting a large range of pressure. Each boiler is 14 feet mean diameter by 14 feet 6 inches in length and contains 3 corrugated furnaces each 45½ inches diameter, and 184 Serres' patent ribbed tubes 3½ inches diameter. The boilers are fitted both for natural and forced draft under grates.

There are five decks, main, saloon, gallery, break and dome, on which are located 361 staterooms (including 14 parlor rooms) for passengers and 35 officers' rooms, making a total of 396 staterooms. In the cabins for the men and women are 219 berths. For

The King Closed Conduit Electric Trolley.

One of the latest inventions in the line of underground electric trolley systems is that of Mr. F. L. King, of Washington. To test this system a short section of the conduit has been constructed on the tracks of the Georgetown & Tennallytown road, where several exhibitions of the system have been conducted, satisfactorily to the inventor and parties interested. One of the ordinary overhead trolley cars was used; the only attachment necessary being two small pulleys suspended two or three inches above the street level, which perform the office of maintaining the cover of the conduit in open position directly underneath the car, and the underground trolley, which can be readily raised or lowered at any time. These attachments can be quickly put on any electric car now in use at a small expense.

The device can be briefly described as a conducting wire laid on a solid and continuous bed of in-

the inner or under part of the cover, and when the cover is down, the wire is therefore perfectly inclosed in insulating material.

When the cover is raised, as shown in Fig. 2, the wire and the small conduit in which it is embedded are laid bare and made perfectly accessible to the trolley wheel, depending from and underneath the car. The only mechanism required to maintain the cover in open position underneath the car is a small pulley, with a beveled or rounded rim to fit the inside of the cover when raised, as shown in Figs. 2 and 3.

There are two of these pulleys or rollers on each motor car, so that the cover, for the distance between them is always opened full width, and it is in this space that the trolley is suspended and makes a contact with the live wire in the same manner as with the overhead trolley as shown in Fig. 3. These opening pulleys being three inches above the street surface, do not interfere at all with the car being run on an overhead line. All that is necessary to operate an underground section, being to open the end of the cover so that the pulleys on the car pass inside of it, when, the cover being continuous, it is

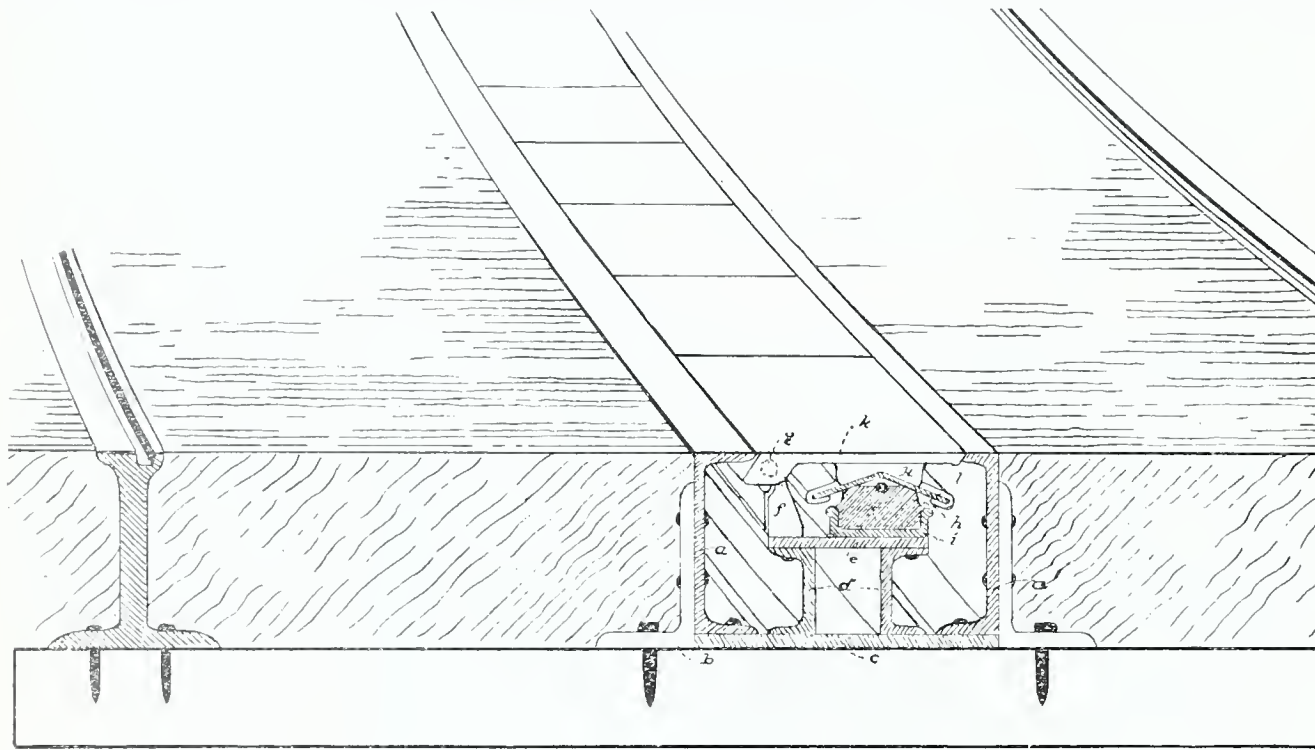


Fig. 1.

insulating material, near the top of a shallow trench and covered over with a flexible and waterproof cover, so adapted as to perfectly maintain street traffic across or along it. The cover being maintained in open position underneath the motor. The construction is very simple. Fig. 1 represents a cross section of the conduit which is placed midway between the rails of the track, and rests upon the stringers of the ordinary roadbed, the depth of the conduit being the same as the ordinary girder rail seven inches. Two channels, *a*, one on either side, constitute the sides of the conduit, being held in position by the strong angle braces *b*, which are securely spiked to the cross tie. These side channels, as well as the two small channels in the center, rest upon a heavy tie plate, *c*, which is riveted to the small channels, *d*, which support the cover and the insulating material holding the wire. These centre channels are perforated at frequent intervals, through their center, so that the space between the perforations is utilized for drainage as well as the space on either side—the conduit being connected with sewers at suitable intervals.

The center channels are joined rigidly at the top by a plate, *e*, to which they are riveted, the same rivets holding in place the drop forging, *f*, which constitutes the bearings on which the cover is hinged, as shown by the journal, *g*. The insulating material, *h*, which in the present construction is asphalt, but which is proposed to be dry hardwood thoroughly soaked in asphalt or creosoted, is laid in a shallow rolled iron trough, *i*, fastened to the plate underneath. The conducting wire is laid on top and partially embedded in the insulation.

The cover which rests on this insulating material, projecting over each side, and thoroughly protecting it, is composed of two different materials. The top piece is a malleable casting, *k*, hinged, and turning on the journal, *g*, its other edge being supported by a lap joint against the flange of the channel, *a*. These castings are flush with the street level, and are laid one after another the length of the conduit. They practically close the top of the conduit, only the sixteenth of an inch space being left on the hinged side. Underneath these and attached to each casting in a very simple manner is a continuous strip of cotton belting, *l*, that is strong, flexible waterproof, and a perfect insulator. It constitutes

constantly maintained in open position, underneath the car, until it has completed a circuit of the line or section. The only friction or resistance in opening the cover, is that of a belt running over the side of a pulley, as, it must be observed that the action of the belt is such that with the cover wide open at any point, it commences to raise the cover slightly five or six feet on either side of that point, the pressure on the pulley being a side pressure or at right angles to the movement of the car.

The special points of superiority claimed for this device over others of a similar nature are: "First, that the arrangement of the conductor is such as to insure perfect insulation, and perfect contact. The wire is partially embedded in insulating material and is perfectly covered over and protected from dirt and water. Snow, rain or sleet cannot affect it, as the cover is always opened and closed underneath the car."

"Second: Its cost is very much less than any other underground system which has been proposed

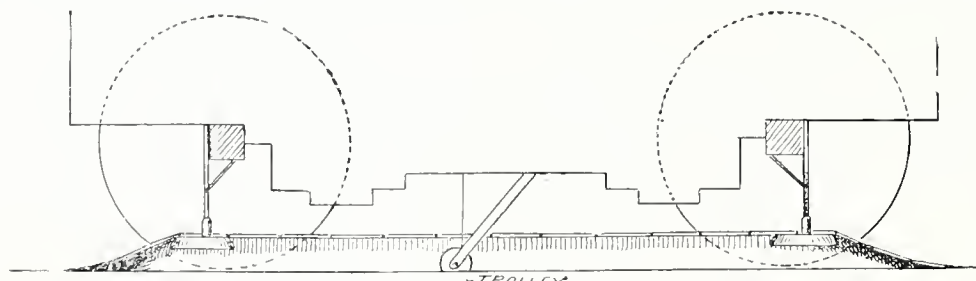


Fig. 2.

so far, being not more than a third of the cost of the cheapest underground system in operation at present. The King system is estimated to cost \$10,000 to \$12,000 per mile of single track and can be put down on existing horse or electric lines without interfering with traffic."

"Third: The conducting wire is perfectly accessible, more so, in fact, than an overhead line, and therefore, under better control than any other underground system. The effective working of the system is thereby insured at all times. The working parts of the device are so simple and accessible that they can be replaced or renewed at any time without any trouble or delay."

"Fourth: A perfect metallic circuit can be ob-

tained, as there is ample room and convenience by this system for a return wire independent of the rails; in addition to this is the great advantage, that auxiliary or feed wires can be laid in the insulating material in the inner conduit without any additional expense for insulation, and at the minimum expense for labor in laying."

It is claimed for this system that the wire is absolutely kept dry and clean in all weather or conditions; there is really no electrical problem with this

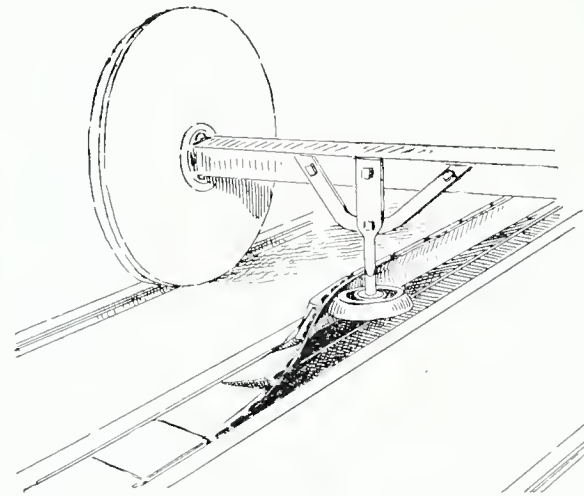


Fig. 3.

arrangement, it is only a mechanical question, in the action of the cover.

In this system the car can be run forward and backward with the utmost freedom, the trolley wheel requiring no change or attention as on overhead trolleys.

Those who have witnessed the experiments with this system have been impressed with its simplicity, perfect working and easy action, and the inventor believes he has solved the problem of rapid transit street railways for large cities.

Economy of High Pressure Steam.

While this question is of vast importance to steam users, it is a fact that it is, to a great extent, overlooked among the smaller steam plants and more especially among the smaller ginners in the Southern country. This, however, is generally done through ignorance, as the ordinary ginner cannot afford to employ a first class engineer, hence he generally pays the difference in fuel and other extra expenditures. I have frequently met with engineers who claim that it requires more fuel to carry a given (high) pressure, say 120 pounds, than it does a given pressure not so great. To this argument I would submit the following scale for water at different temperatures; here are four notable temperatures for pure water, viz:

1. Boiling point at sea level 212° F.
2. Point of maximum density 39.1° F.
3. British standard for specific gravity 62° F.
4. Freezing point at sea level 32° F.

Ice is liquified and becomes water at sea level at 32° F. Above this point water increases in temperature up to the steaming point, nearly at the rate of 1° for each unit of heat added per pound of water. The steaming point, 212° F. at atmospheric pressure, rises as the superimposed pressure increases, but at a decreasing ratio; as, for example, at atmospheric pressure it takes it takes 3½° to add a pound, while at 150 pounds ½° gives the same increase of pressure.

Hence you will readily see from the above facts the higher the pressure the greater the opportunity for economy in generating power. Aside from this fact, steam at a low pressure is very wet and has little expansive force—a point indispensable with high speed engines—and carries a great deal of water from the boiler to the engine. This water is not only a detriment to the

running of the engine—cutting the valves, rings and walls of the cylinder with grit—but must be replaced with water invariably at a much lower temperature, necessitating more fuel to heat this additional water. Hence the pressure of steam should only be limited within the bounds of safety as touching the strength of boiler and design and condition of engine.

SILAS J. WILLIAMS, S. & M. E.

Floyd, Texas, May 14, 1894.

Names of Patent Solicitors.

Names and addresses of attorneys practicing before the United States Patent Office, carefully compiled by Virginia W. Middleton, for sale by the INVENTIVE AGE; cloth \$1.50; paper \$1. Edition limited.

SCIENCE FOR YOUNG PEOPLE.

Conducted by E. P. LEWIS.

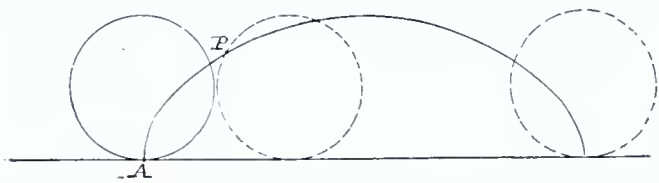
Ordinary table salt is a chemical compound of chlorine gas and the metal sodium. Sodium, and potassium, another metal very much like it, are very abundant in combination with other substances, but are rare and expensive in the metallic state. When pure they are whitish metals somewhat like silver, very light and very soft. One of their most interesting properties is their conduct toward water, which makes it necessary to keep them in petroleum or some other liquid for which they have no attraction, to protect them from the moisture in the atmosphere. If you throw a piece of one of them in water it will hiss and splutter around violently, and appear to be on fire. The reason is that they have a strong tendency to decompose water, which, as you know, is a combination of oxygen and hydrogen gases. These metals unite with the oxygen and part of the hydrogen to form what we call caustic potash or soda, and part of the hydrogen is set free. The free hydrogen is set on fire by the heat produced by the chemical action. It looks rather queer to see water set anything on fire, as it appears to do in this case. A laboratory boy in one of our universities one day saw a piece of sodium which had been carelessly left on the lecture table. On taking it up in his wet hands it blazed up and burnt him. He naturally threw it in a vessel of water to put out the fire. When it struck the water a little explosion followed, and several bits of sodium flew in his face and burnt him severely. There never was a more surprised boy, and it will be a long time before he forgets that water will not always put out a fire.

* * *

Even more absurd than the idea of water setting anything on fire seems the idea of freezing water in a red-hot vessel, but it has been done. If you pour some water on a very hot piece of metal it will break up into round drops, which will run in all directions. When the metal becomes colder these drops will suddenly explode into steam. The reason is that a thin cushion of steam is formed under the water, and protects it from the heat, since steam is a very bad conductor of heat. As the water does not touch the metal, its surface tension makes it take a spherical shape. As the metal cools down the layer of steam disappears and all the water suddenly comes in contact with the metal and is at once turned into steam. The water is now said to be in the spheroidal state. You can prove that it does not touch the hot metal by putting a candle behind it for you can see the light between the metal and the drop. The temperature of the drop can be easily measured with a small thermopile, and will always be found to be below the boiling point. Now you can see how water can be frozen in a red-hot vessel. When sulphur is burned it unites with oxygen and forms the disagreeable gas used in fumigating, called sulphurous oxide. By cold and pressure this gas can be reduced to a liquid, and if some is poured on a hot surface it will assume the spheroidal state, with a temperature of about eleven degrees centigrade below the freezing point of water. If we pour some of this liquid in a platinum crucible heated red hot and add a small quantity of water, the two liquids will be protected from the heat by the cushion of vapor under them, and the intense cold of the sulphurous oxide will freeze the water, and by quickly throwing it out a small piece of ice may be obtained. If you wet your hand you can safely dip it in melted lead or iron for a very short time for the steam will protect it.

* * *

Does the bottom point of a wagon wheel move? You will probably answer, "Yes, of course it does." But it does not move—not so long as it remains the

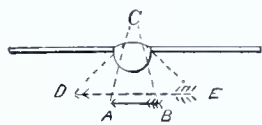


bottom point. You can prove it in a very simple way. Fasten a pencil on the edge of a wheel and roll it along so that the pencil will trace a line on a wall or upright board. You will get a curve (to which the name cycloid has been given) like the dotted line in the diagram, where P is the pencil. Just before the pencil reaches the ground at A—that is, just before P becomes the bottom point—it is going downward. When it begins to move from A it is going straight upward. P must stop going down

before it can begin to go up, and so must have been still at the instant it touched the ground. This seems reasonable enough when you think about it. If the bottom point of a wheel moved either backward or forward it must slip instead of rolling.

* * *

You can make a simple microscope of considerable magnifying power by making a large pin hole in a piece of tin foil or even a leaf and putting a drop of water on it. The surface tension of the water holds



it stretched across the hole in the shape of a convex lens. The diagram shows how it magnifies. If your eye at C looks at a small arrow AB, the lines AC and BC will be bent by refraction so that they appear to come from the directions DC and EC, and the arrow is magnified to the length DE.

* * *

Light enables us to see material objects, but light itself is absolutely invisible. When it falls directly on the eye from the object producing it, or when it is reflected into our eyes from other bodies, we see these objects, but we cannot see the light while it is passing through space. We can only tell that a ray of light is passing through a dark room by the reflection from the dust particles, and we could not see it if there were no dust in the air. The sky looks bright and blue because of the light reflected from the dust and water vapor in the air. If these did not exist, the entire sky would be absolutely black with the sun and stars blazing out like distant electric lights at night.

Books and Magazines.

Cassier's Magazine for June opens with a picturesque article by Albert Spies, entitled "Ascending Pike's Peak by Rail." The story of the mountain, of the town of Manitou, which nestles at its foot and of the old and the new way of reaching its summit is told in an attractive manner, and engineering data and graphic descriptions of mountain scenery are blended into a most interesting whole. A large number of photographic views add to the make-up.

* * *

The speeches, lectures and letters of Wendell Phillips—a choice selection made by himself—were published in 1863. This volume, however, contained but few of the speeches made by this great orator during the most exciting period of American history—the quarter of a century of anti-slavery crusade, culminating in civil strife. A second series of speeches, lectures and letters has just been issued, covering a wide variety of subjects. Wendell Phillips was the champion of reforms of every nature, and his lectures and letters were characterized by their boldness and logic. New York: Lee & Shepard, publishers; "Good Company Series," 50 cents.

* * *

Vol. 1 of Funk & Wagnalls' Standard Dictionary of the English Language, fully sustains the claims of the publishers in their prospectus that "from beginning to end, the Standard Dictionary will be the work of men thoroughly equipped in the schools of science, literature, and art, and of experts in all handicrafts and trades." The work is being sold only by subscription, and is printed in two forms—single-volume and double-volume. To enumerate the distinguishing features of this work would require a great deal of space. In the definition of words the most common meaning is first given—that is, preference is given to the "order of usage" over the historical order as appears in other dictionaries. Phonetical spelling of words, to a limited extent, is adopted in this dictionary—that is, silent letters when "phonetically" useless are dropped. Another useful feature is the treatment of synonyms and antonyms, and a systematic treatment of the compounding of words. Although Vol. 2 is not yet completed the publishers announce that they have already expended over \$500,000 in the preparation of the work. That the Standard will be complete in every detail is guaranteed by the high standing of the specialists, and scientific and literary men engaged in the preparation and revision of the matter. In this dictionary only proper names or proper terms derived from them have been printed with initial capital letters, thus enabling anyone to determine at a glance whether a word is to be capitalized or not. In the syllabication of words and the dividing of words at the ends of lines printers will rejoice that this work gives preference to divisions exactly the same as in pronunciation. To show to what proportions the English language has grown it is observed that in Johnson the full number of words and terms for the entire alphabet is 45,000; in Stormouth, 50,000; Worcester, 105,000; Webster International, 125,000; Century, 225,000; Standard, nearly 300,000.

AN AUTOMATIC CAR FENDER.

(Continued from first page.)

tracks, the feelers are directly under the forward end, and the fender proper is riding just in front of the first wheels, with its arms sufficiently high to pass over all irregularities of the road bed. The instant the feelers touch an object on the tracks or road bed, the fender arms drop by their own gravity and pick it up and carry it along with the car.

Unless a person has been thrown beneath the car or some object is upon the track or road bed which should not be there, this fender will remain in its set or locked position an indefinite period. But just the instant the feelers are touched by some unnatural object on the track, the fender is released and comes automatically into operation, just as the dog on a gun moves forward when the spring is released by pressing on the trigger, the principle of this fender differing, however, from the gunlock in that gravity carries the fender into position, no springs or other unreliable force being depended upon. As soon as the object picked up has been removed the fender is set again, and will remain in this position until released by the feelers detecting something on the track or road bed.

It will thus be seen that by the use of the Smith Automatic Fender the motorman or gripman is relieved of all fear of crushing people with the wheels of the car. He knows that if he is unable to stop the car when a person is thrown under it, that this fender will automatically come into proper position by its own gravity, and with its round smooth-ended arms pick the body up and carry it safely along until he brings the car to a full stop. If a child runs in front of his car, or a thoughtless person suddenly steps before it and is knocked down, the horror of having mangled or killed the unfortunate one will not be his, for when the car has been stopped he will find the victim safe and sound riding on the arms of the fender.

A test was recently made as to the efficiency of this fender, a motor car on the Washington & Georgetown cable line being fitted up with one of these devices. Dummies representing human beings in form and size from a child to a large man were used and filled with material to give them the conditions of the rigidity and flexibility of the human body. About twenty different tests were made with the car running at full speed. At every one of these the fender worked with positive accuracy, preserving the form of the dummies and demonstrating its perfect automatic action. One of the dummies that had been used a number of times with this new fender, and uninjured in any manner, was then placed in front of one of the regular motor cars, which was equipped with another style of fender, and the dummy was drawn beneath the car and fender, torn open, and its contents scattered along the road bed, showing that had it been a human being, limbs would have been broken and life probably crushed out.

This is one of the instances where necessity inspired inventive genius to supply the demand made upon it. The fender is composed of the same material from which street cars are constructed, has the fewest working parts and each one performs its function quickly and surely. It is placed and operates automatically just where a life-saving device of this character should be located—underneath the car in front of the wheels and trucks.

It will, no doubt, attract attention and be very generally adopted because of its simplicity and economy of construction and absolute certainty of being efficient in saving the lives and limbs of persons who may be thrown under the wheels of cars to which it may be attached.

The Automatic Car Fender Company is to be congratulated upon its selection of a fender which possesses the features of simplicity, economy, interchangeable parts, automatic operation and ready adjustment to every style of car.

Patent Rain-Skirt.

Among the novel inventions of recent date is that of Max Cohn, of Milwaukee, Wis., in the shape of an underskirt designed to protect the outer skirts of a woman's apparel from being soiled by contact with her shoes, or from water and mud "splashing" on the street, and as the inventor puts it, "to serve as a shield against involuntary exposure of the limbs when the outer skirts are raised." A lower or separate portion of the skirt is provided, made of water proof material, consisting of a series of overlapping flounces, so arranged as to be attached to the outer skirt and adjacent to the feet. Only the waterproof portion of the skirt will come in contact with the feet of the wearer, while at the same time the splashing and mud or dust will be kept from soiling the outer skirts.

Names of All Patent Attorneys.

There has recently been compiled by Virginia W. Middleton, the well known stenographer, a list of all attorneys practicing before the United States Patent Office. This little volume is of incalculable value to inventors, attorneys and manufacturers. The cloth binding costs \$1.50 and paper cover \$1. Send to THE INVENTIVE AGE, Washington, D. C. Edition limited.

PATENT DECISIONS.

GLIDDEN *vs.* NOBLE.

In this, an interference case in the Patent Office, and reported in vol. 67, O. G. page 676, Commissioner Seymour decided that where the invention of one of the parties to an interference was inoperative, priority of invention could not be awarded to him. This rule is an established principle of law since an inventor has nothing patentable until the device is complete and operative, and this being the case, he certainly could not be awarded priority on an inoperative invention, which, because of its inoperativeness, had no attribute of patentability.

GLIDDEN *vs.* BUSELL.

This was another interference case in the Patent Office and was reported in vol. 67, O. G. page 675. Here it was declared, by Commissioner Seymour, that where one of the parties to an interference had first made a machine upon which the issue could be read, but which was inoperative and was dismantled and not assembled until and except for the purpose of interference, and, furthermore, after such dismantling the party continued to experiment in that line with other devices and finally was only successful by substituting in his machine the device of another inventor, the first machine was an experiment and not a reduction to practice. Glidden constructed in 1886 a machine for trimming heels of shoes when in the process of manufacture, and one in which the rand knives were connected with the hollow heel cutter shaft by a flexible coil shaft, and with this machine trimmed and randed a few heels. It was treated as an experimental machine, was dismantled, and was never again assembled until it became necessary for the purposes of the above quoted interference. He experimented with other devices for driving the rand cutter and finally adopted a device known as the "Winter Invention." This device consisted of a small shaft with universal joint, by which shaft the rand cutter was driven, the joint being provided to permit movement of the shaft other than axial movement, and to overcome the disadvantages which attended the coil shaft and which made such shaft impracticable. These being the facts it was held that the coil shaft was not such a connection for the rand cutter and cutter head as completes the invention, and that the 1886 machine was experimental and does not afford the basis of a judgment of priority in favor of Glidden, as against the patent of Busell. This decision is clearly a good one, since it would be directly against the established principles of law to practically declare a patent void by reason of a pre-existing but inoperative machine.

KOHLER MANUFACTURING CO. *vs.* BESHORE.

This was a trade mark case which came before the U. S. Circuit Court of Appeals, Third District, on appeal from the Circuit Court of the U. S. for the Eastern District of Pennsylvania, and one in which the Kohler Manufacturing Co., sued E. S. Beshore for the infringement of the trade mark, consisting of the words "One Night Cough Cure." Several important points were decided in this case. One was that the sale of a few dozen bottles of a medicinal preparation, with written labels affixed, bearing a name different from that previously used for such preparation, does not amount to use in such circumstances as to publicity and to such length of use as to show an intention to adopt the written words as a trade mark. Because the plaintiffs in this case had so used the mark they were refused an injunction and account against the defendant. It was also decided that although the registry of a trade mark under the act of March 3, 1881, does not affect the common-law right to a trade mark, the statements made in such registration may be used as evidence in a suit on common-law rights and to show what the complainant really claimed; still further, the court decided that in such suits the statement filed to obtain registration and attached to the affidavits on motion for preliminary injunction may be considered on the final hearing. In the decision the court intimated that equity will not intervene to protect the use of words claimed as a trade mark between owners of quack medicine or where the words used assert a manifest falsehood or a physiological impossibility, as in "one night's cough cure." This question did not receive positive adjudication, but the correctness of the doctrine was intimated in the opinion of the court.

NATIONAL CASH REGISTER CO. *vs.* LAWSON CONSOLIDATED STORE SERVICE CO.

In this case, reported in vol. 67, O. G. page 680, the U. S. Circuit Court, District of New Jersey applied a well known principle of law to the patents of one Lord and of one Boyer, both of which were

owned by the National Co. This case arose under the provisions of Revised Statute No. 4918, which provides for the appearance in court of the parties to an interference in which a patent has been granted to an inventor adjudged to have priority though the defeated contestant had previously received a patent for the same thing. The successful party to the interference was one Juengst, his patent being owned by the Lawson Co., and the evidence shows that before the earliest date of either Lord or Boyer, Juengst had produced a full size working machine, and that it had fully accomplished at the date of its construction the work for which it was designed. Its mode of operation and utility were appreciated and understood by those who saw it operate. These being the facts it was held that such a machine constituted a reduction to practice regardless of the question whether various other mechanisms common to all such machines worked with practical success or not.

EX PARTE SILVERS.

This case a decision of the Commissioner of Patents, was the means of establishing quite a precedent in trade mark practice, and its ruling was a radical departure from the former practice of the Patent Office. It has been the custom of the Patent Office officials to require applicants for trade mark registration to restrict the use of the trade mark to one of the various classes into which trade marks are divided, and upon attempting to enforce this rule in Silvers' application, Silvers appealed to the Commissioner who declared that there was no authority in the law for such requirements. He only qualified this rule by the proviso that if a person had previously registered a trade mark similar to that of the applicants and for use on one of the articles of trade for which the applicants was intended, the applicant should be required to restrict the use to these articles which were not mentioned in the prior trade mark. The reason for this is obvious, since no two persons can have trade marks for the same symbol and applied to the same article of trade. The former practice of the Patent Office was based on a construction of the trade mark law by which the requirement that the applicant should specify the particular description or class of the goods to which the mark was applied, was held to mean that the mark must be restricted to this particular class or species, since such a ruling would be the logical conclusion to be drawn from the statutory requirement. The decision was reported in vol. 67 O. G. page 811.

MORGAN *vs.* DANIELS.

In this case, a decision of the Supreme Court and reported in vol. 67 O. G. page, 811, Morgan asked to have the patent of Daniels set aside and the Patent Office instructed to grant him, Morgan, a patent for the same invention. On June 26th 1886 Morgan filed an application for patent and the application was subsequently involved in an interference with Daniels' application, which interference resulted in a decision favoring Daniels. Upon this decision Daniels' patent issued, and Morgan now goes to the courts under the statute of the U. S. No. 4915. The suit was first started in the Circuit Court of the U. S. for the District of Massachusetts, and came to the Supreme Court by appeal, the Circuit Court having given a decision in favor of Morgan. The Supreme Court, however, reversed the decision of the Circuit Court and declared that where the question decided in the Patent Office is one between contending parties as to priority of invention the decision there made must be accepted as controlling upon that question of fact on any subsequent suit between the parties, unless the contrary is established by testimony which in character and amount carries thorough conviction. Daniels' patent, therefore, stands and Morgan has now no further remedy. This rule is not new since it was established, in substance, in *Coffin vs. Ogden* (18 Wall 120) and in *Cantrell vs. Wallick* (35 O. G. 871). In both of these cases similar questions arose and they were decided in accordance with the rule of Morgan *vs.* Daniels. The evidence in this case showed very closely related dates of conception; Morgan claimed to have conceived the invention in July 1878, while Daniels can only prove conception in October, 1878. Daniels, however, proves this point beyond a doubt, but Morgan's testimony in support of his contention is questionable. These facts establish a case which fits the rule and, therefore, the decision for Daniels.

DURAND HUGUENIN & CO. *vs.* GREEN SCHULZE BERGE & KOECHLIN.

This case resulted in a decision of the U. S. Circuit Court for the Eastern District of Pennsylvania, and was reported in vol. 67 O. G. page 814. Here some very logical principles of patent construction were applied to the patent of Horace Koechlin No. 253,721, and the only claim of said patent declared to be for a process merely, and not to include the product

which the owners of the patent contended was within its scope. The claim of Koechlin's patent was very vague and indefinite and was for the manufacturer of coloring matters by the action of nitroso derivatives of the tertiary amines on tannin. The language of the claim was such to render its meaning very uncertain and it could not be definitely determined whether the claim was for a process of for the product resulting therefrom. The court, however, favoring the inventor as it should, ruled that the process of subjecting tannin to the action of nitroso derivatives of the tertiary amines was the only subject of the claim. By no rule of construction could they hold that the claim embraced the product though it was urgently contended by the complainant that such was the case. Since the defendants only infringed the products and since the claim of the Koechlin patent could not be held to conclude the same; the bill of the complainants was dismissed.

PETERS *vs.* HISEY.

This was a decision of the Commissioner of Patents in an interference case coming before him on appeal from the Examiners in Chief. The subject matter was a cartridge loading machine, and the evidence showed that Peters conceived the invention in September 1888, reduced it to practice in November 1888, and put it into extensive public use in March 1889. On the other hand, Hisey contends to have conceived the invention earlier, but the fact is only corroborated by the recollection of one witness to a conversation four and one-half years since. With these facts in view Commissioner Seymour declared that the conception of Hisey was not sufficiently proven as against the unmistakable evidence of his opponent, even though his opponent conceived the invention later than the date sought to be proven by Hisey. It is well settled that verbal evidence of disclosure, such as characterized Hisey's proof, does not prevail over evidence supported by the actual exhibition of the sketches employed in the disclosure. The reason for this rule is that there is a possibility of mistake or forgetfulness in the case of verbal evidence, while there is but little chance of a mistake in the case of evidence by duly authenticated exhibits. This case was also the means of deciding that a disclosure on board a foreign ship in mid-ocean may be received on the question of conception of an invention. This rule is clearly an equitable one, since there could be no reason for refusing to admit it simply because it originated at sea, provided the proof properly establishes its existence. In this case, however, the evidence was inadmissible as it was not sufficient to establish the fact of the disclosure.

EX PARTE DRAWBAUGH.

This was an appeal to the District of Columbia Court of Appeals from the decision of the Commissioner of Patents' ruling that Drawbaugh was not entitled to a patent since his invention was in public use and on sale for more than two years before the filing of the application. Drawbaugh admits the prior use, but contends that it was without his knowledge or consent, and that knowledge or consent of an inventor is essential in such cases. In support of this contention Drawbaugh argues that this was formerly the rule and that it should be implied or "read in" the later statutes on the subject. The court held, however, speaking through Judge Shepard, that where the words of an act or part of an act are plain and clear and not inconsistent with the general object of the statute, and lead to no absurd result, the courts have no right to refuse their operation or to limit their effect by a construction based on conjecture. Therefore, they held that it was not necessary that the inventor be acquainted with the fact of prior use, and that his patent was barred by the mere fact of such use for two years before the filing of the application. This has been generally understood as the correct rule, and it is supported by the case of *Andrews vs. Hovey* (42 O. G. 1285). Though this decision, *Andrews vs. Hovey*, was made under the law of 1839, it is well applicable to Drawbaugh's case, since the law of today differs but little from the former in this particular point. The decision in the Drawbaugh case was published in vol. 67 O. G. page 929.

KERRY *et al vs.* TOUPIN.

This was a trade mark case and the decision was rendered by the United States Circuit Court, for the District of Massachusetts. It was the means of deciding two questions of trade mark law, or rather of deciding one question and re-affirming the answer to a second question. The point decided was that citizens of Canada who are engaged in the manufacture of trade marked articles and who have a place of business in New York where they make and ship such articles for

NEWS CONDENSED.

sale in the United States, are within the International Convention of March 20, 1883, for the protection of industrial property, and they may sue in the U. S. Courts for the infringement of their trade marks by its citizens. The International Convention of March 20, 1883, provides for the trading in one country of a merchant who lives in another and for the protection of his trade mark rights. In other words, it is a law of trade marks which extends over the countries entering into the agreement, and in so doing goes beyond the laws of the several countries. The point which the court reaffirmed was that persons who manufactured a medicinal compound under a certain name and bound in a certain wrapper and who sold the compound so identified for twenty years or more, had a right to claim the exclusive use of the mark and to be protected against infringement by persons making similar goods. This is the theory of the common law trade mark and it has been the rule ever since the days of Blackstone. It is only necessary that the mark be used with such publicity and for such a length of time that the public will become acquainted with it, its ownership and the goods which it identifies. These pre-requisites are essential to the exclusive ownership of a trade mark and when once performed, establish an indefeasible right, one which may be sold or assigned with the business in connection with which it is used. It is not necessary as the decision in this case would imply that the trade mark be used for twenty years, since any length of ownership which would be sufficient to acquaint the public with the mark and its function is sufficient.

U. S. EX REL, THE STATE OF SOUTH CAROLINA VS. JOHN S. SEYMOUR, COMMISSIONER OF PATENTS.

This decision arose out of an application by the State of South Carolina for the registration of a trade mark for use in the liquor trade which had been recently established in that state. It has probably been the hardest fought case that ever arose out of the Patent Office. The Commissioner of Patents rejected the application and refused registration of the trade mark on the ground that the State of South Carolina or any State in the American Union is not that corporation which the law contemplates in its provision for the registration of trade marks. The Commissioner contended that the State did not, and could not, own the trade mark, and this, because the law which established the system of liquor trade was illegal and that all acts which arose out of said law were equally illegal. From an adverse decision in the Patent Office, the State appealed to the Court of Appeals in the District of Columbia, which decided that the action of the Commissioner was in error and ordered him to issue the registration notwithstanding his adverse decision. This ruling of the Court of Appeals was attained by a petition for the issue of a mandamus ordering the Commissioner to issue the registration as a ministerial duty. The question was, therefore, one as to the nature of the Commissioner's duty, whether it was judicial or ministerial. If judicial the decision could not be reviewed by an appellate tribunal, while if the Commissioner's duties are ministerial the writ of mandamus will lie. From this decision of the Court of Appeals the Commissioner appealed, through his counsel, Mr. Levin H. Campbell, to the Supreme Court of the District of Columbia, which reversed the decision of the Court below and refused the writ. The State then appealed the Supreme Court of the United States from the District Supreme Court. The former Court rendered its decision on May 14th, which arose on a motion to dismiss the case on the ground of a lack of jurisdiction. The law authorizing appeals to the Supreme Court in causes having their origin in the District of Columbia only provides for cases in which it appears from the record that the amount in question is \$5000 or that the case is one which questions the validity of a patent or copyright or a statute or treaty. The State of South Carolina contended that the case was within the purview of the law, since the value of the trade mark was greatly in excess of \$5000. As to this point the court declared that the pertinent question was whether the actual subject of the controversy amounted to \$5000, and not whether collateral matters had that value. Since it could not be contended that the registration of the trade mark had any such a value, it followed that the Supreme Court had no jurisdiction. Therefore, the decree dismissing the case. With this decision of the Supreme Court one of the longest and most interesting controversies arising out of the Patent Office was settled. It is very much regretted that the Court did not decide the validity of the Commissioner's action, since this has been doubted by many, for it has been contended that the Commissioner had no authority to go beyond the question of ownership as between two contesting parties, for it is only in such cases that the law provides for questioning the ownership of a trade mark. The State presented a formal application and asked registration on a true and lawful trade mark, which many contend, merits favorable action in the absence of an opposing party. The decision was published at length in vol. 67 O. G. page 1191.

MAY 1.—George W. Abell, editor of the Baltimore Sun, died. The Supreme Court of Montana, at Helena, denied the application for a mandamus to compel the Great Northern Railroad to operate its lines. Paul J. Sorg, dem., was elected over E. J. Rathbone rep. by over 1,700 majority in the third Ohio Congressional district. J. T. Ailman was nominated for Governor by the Populists of Pennsylvania. Indiana town elections showed heavy Republican gains. The Great Northern Railway strike was ended by arbitration. "Gen." Coxey defied the authorities and attempted to march the "Commonwealth Army" through the Capitol grounds; while attempting to speak from the Capitol steps Coxey, Browne and Columbus Jones were arrested and jailed.

MAY 2.—At Cleveland, Ohio, a mob of 6,000 men, mostly foreigners, partially demolished the iron mills, and drove out the workmen and defied the police. Eight hundred brick yard employees at Kingston, N. Y., struck against lower wages. The International Bimetallic Conference opened at London. Two hundred Mexican soldiers were killed in a battle with the Yaqui Indians.

MAY 3.—The new cruiser, "Marblehead," completed her trial trip. Prof. C. V. Riley, chief etomologist of the Department of Agriculture, has resigned. Earthquakes continue throughout Greece.

MAY 4.—In the conflict with strikers of the Pennsylvania coke regions ten men were shot and two officers brutally assaulted. The Massachusetts House of Representatives agreed to the amendment of the Constitution providing for the referendum. Ex-President Harrison, at New York, denied that he was a candidate for Presidential nomination. The Antwerp exposition opened with appropriate ceremonies.

MAY 5.—Ex-United States Minister to Australia, John Jay, died at New York, aged 77 years. "General" Kelly's army has arranged to float down Des Moines river on flat boats. John Patton, Jr., was appointed U. S. Senator by Governor Rich to succeed the late F. B. Stockbridge.

MAY 6.—As a result of the coal strike the price of coal in Chicago raised from \$2.75 to \$4 per ton. At Muncie, Indiana, the William N. Whitley Reaper and Mower Works burned; loss, \$250,000. Hail storms did much damage in many parts of the country. The Italian government has decided against immigration to America during the present depressed condition of affairs.

MAY 7.—It is announced that Richard Crocker is to retire from the active management of Tammany organization. The strike in the Connellsville coke regions has resulted in a complete shut down. Striking coal miners in Alabama resorted to dynamite.

MAY 8.—Gov. Jones Wolfe, of the Chickasaw nation, was arrested on the charge of embezzlement. The sixth annual convention of State Railroad Commissioners began at Washington. H. N. D. Pierce, of Massachusetts, was named by the President to be Secretary of Legation at St. Petersburg. The Prohibition law was decided in force by the Supreme Court of South Carolina. The New York State Constitutional Convention organized at Albany. In the Washington police court the jury found Commonwealers Coxey, Browne and Jones guilty of violating the police regulations of the Capitol grounds.

MAY 9.—General Matthew M. Trumbull died at Chicago, aged 68 years. A large number of the Galvin "Industrial army" were arrested at Pittsburgh for trespassing on trains and sentenced to prison for 20 days. Kelly's army of 1,250 arrived at Des Moines on 150 flat boats. A resolution favoring the legalization of pooling agreements was adopted by the Convention of Railway Commissioners.

MAY 10.—A fire at Norway, Me., damaged property to the extent of \$239,000. The Mary Washington monument at Fredericksburg, Va., was unveiled. In the conflict with Coxeyites, who stole a train at Yakima, Wash., two deputy marshals and several citizens were shot. On account of ill health, Major J. W. Powell, Director of the U. S. Geological Survey, resigned. The House Committee on Agriculture report adversely on bills for the extermination of the Russian thistle.

MAY 11.—Pullman car employees to the number of 2,000 struck for last year's wages. Chas. D. Walcott, of New York, was named by the President to be Director of the Geological Survey. John McQuade was named as Richard Crocker's successor as Tammany boss. The Sugar Convention at New Orleans adopted resolutions urging the retention of the sugar bounty.

MAY 12.—The dock trial of the battleship "Texas" at the Norfolk navy yard was said to be successful. At Akron, Ohio, fire destroyed the Akron Varnish Co.'s works; loss \$100,000.

MAY 13.—A large number of combats of officials with "Industrial armies" were reported from western points. Dr. Talmage's Brooklyn tabernacle burned; loss, \$1,000,000.

MAY 14.—U. S. Senator Don Caffery was re-elected by the Louisiana Legislature. The appeal of John Y. McKane was dismissed by the U. S. Supreme Court. Col. Breckenridge was expelled from honorary membership of the Union League Club in Chicago.

MAY 15.—"General" J. S. Coxey was nominated for Congress by the Populists in the Massillon, Ohio, district. One hundred and thirty-seven buildings burned in Boston, leaving 480 families homeless; loss, \$500,000. Leland O. Howard was appointed etomologist of the Department of Agriculture to succeed Prof. C. V. Riley. The motion for a new trial of Coxey, Browne and Columbus Jones was overruled by police Judge Miller. Dr. Rice won the Brooklyn handicap; time 2.07½.

MAY 16.—At Pawtucket, R. I., fire destroyed four coal and lumber yards; loss, \$500,000. 15,000 brick yard employees at Poughkeepsie, N. Y., rioted. W. H. Edwards, U. S. Consul General at Berlin, died.

MAY 17.—The 106th General Assembly of the Presbyterian church in the United States met at Saratoga. Storms in Ohio, Michigan and other western states, caused damage estimated at \$1,000,000. The Prohibitionists of California nominated Henry French for governor. The Populists of Georgia nominated J. K. Hines, of Atlanta, for governor. By the recent outbreak in Venezuela, several thousand lives were lost.

MAY 18.—The Hillsboro College, at Hillsboro, Ohio, burned; loss \$500,000. For stealing Union Pacific engine, "General" Carter and his staff were fined and imprisoned. The worst storm of the season raged on Lake Michigan; many vessels were destroyed and crews drowned.

MAY 19.—Two Northern Pacific trains were stolen by Coxeyites. The new Public Printer discharged over 700 employees of the Government printing office, in order to reduce the force.

MAY 20.—Ex-General Master Workman Powderly, A. W. Wright and P. H. Quinn, Knights of Labor, were discharged from the order on the charge of disloyalty. The Coxeyites who stole Northern Pacific trains were arrested by deputy marshals in Montana.

MAY 21.—Many of the plants in the Connellsville coke region begun operation. The Manchester ship canal was formally opened with great ceremony by Queen Victoria. Coxey, Browne and Jones were sentenced to twenty days in jail.

MAY 22.—A vote of urgency on the eight-hour bill in the Chamber of Deputies, caused the defeat and resignation of the French ministry. Col. Oates was nominated by the Democrats for governor of Alabama.

MAY 23.—Chas. H. J. Taylor, colored, was finally confirmed as

recorder of deeds for the District of Columbia. Hastings was unanimously nominated for governor of Pennsylvania by the Republicans.

MAY 24.—The officers of the U. S. Cruiser "Albatross" had a dinner and great ovation at St. James Hall, London, on the city election at Norfolk the Prohibitionists won. J. A. Webster was nominated for governor by the Populists of Virginia. Queen Victoria's 75th birthday was celebrated throughout England's possessions.

MAY 25.—The senatorial investigation committee found that Maj. Buttz, who was irresponsible, had made certain charges to bribe Senators Hutton and Kyle. There was a serious conflict between the strikers at Cripple Creek Co., and the authorities.

MAY 26.—Prof. Smith was convicted of heresy at the Presbyterian General Assembly in Saratoga by a vote of 296 to 161. Governor Waite ordered out the troops to suppress the Cripple Creek rioters.

MAY 27.—Troops were ordered out to suppress the striking rioters at Minonk, Ill. David Taylor, of Boston, was nominated by the Socialists for governor of Massachusetts.

MAY 28.—Judge Bradley decided against the right of Col. Breckenridge to appeal on technical grounds. The operators of the soft coal mines in the Clearfield region, Penn., decided to employ new men and resume operations.

MAY 29.—Galvin's "army" joins Coxey's forces at Highlands. M. Dupuy succeeding in forming a new French ministry. A reduction of over 300 was made in the working force of the War Department.

MAY 30.—Senator Kyle's little daughter was bitten by a mad dog. At Richmond, Va., Memorial Day was celebrated by unveiling the monument erected to the memory of Confederate soldiers. Six persons were killed in a railway accident on the Wisconsin Central. Great loss of life and property reported from floods in British Columbia. Leaders of the "Commonwealers" who stole the Northern Pacific train in Montana, were sentenced to six months in jail.

An Important Patent Office Decision.

For the past two years a hotly contested interference case has been carried on between three large representative Hay Tool manufacturers, as to the question of priority of right to the double beaded and intermediate flanged suspension rail for hay carriers; and also to the said rail in combination with suspension bifurcated hooks adapted for connection with the upper bead, and adjustable knocker blocks attached by set screws to the lower bead. The parties to these interferences are J. E. Porter of Ottawa, Ill., represented by Mason, Fenwick and Lawrence, patent lawyers of Washington, D. C.; William Loudon of Fairfield, Iowa, represented by Charles D. Fuller, U. S. District Attorney for southern Iowa and H. A. Seymour of Washington, D. C.; and H. A. Durr of Utica, New York, represented by Messrs. Risley and Robinson, patent lawyers of Utica, New York, and McLeod, Calver and Randall, patent lawyers of Washington, D. C.

At the hearing before the Examiner of Interferences priority was awarded to Loudon on the ground that he was the first to constructively reduce the inventions to practice—having filed his application three months ahead of Durr and five months ahead of Porter. The facts showed, that Porter conceived the invention, and made models prior to Loudon; that Loudon conceived the invention prior to Durr, but never actually made a rolled rail, while both Porter and Durr made rolled rails subsequent to Loudon's application.

On appeal to the Examiners in Chief, from the decision awarding priority to Loudon, the Examiners in Chief, June 1, 1894, reversed both of the decisions and awarded priority to Porter in both cases, thereby confirming the patent granted December 13, 1892, to Porter, for the rail *per se*, and insuring the issue of another patent to Porter for the combination, should no appeal from their decisions be taken and a different decision rendered. About seven hundred pages of testimony were taken, and elaborate arguments prepared.

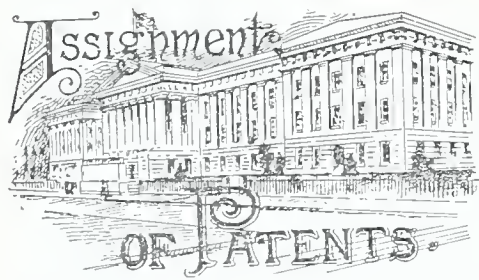
The invention is considered one of great importance, and the new rail was first rolled by the Chicago Rolling Mill Co., for the J. E. Porter Co., of Ottawa, and rolled for Durr subsequently by the Sweet, or Syracuse, N. Y., Rolling Mill Co.

One would hardly think that a small matter of this kind would possess enough importance to engage the time and capital of the J. E. Porter Co., of Ottawa, Ill., the Loudon Machine Co., of Fairfield, Iowa, and the Charles H. Childs' Manufacturing Co., of Utica, New York, but when the vastness of our agricultural business is considered, the wonder will cease. There is no telling how important a patented article in a certain class may be found. This special type of rail has been sought after for many years by hosts of hay tool manufacturers, but none of them hit the nail upon the head, until the first of these contestants conceived the idea of making a cross shaped rail with a bead or head at the top and bottom of its vertical web, whereby side tracks for the wheels of the hay carrier to run upon were afforded, and at the same time a means for attaching suspension hooks at top, and knocker block at bottom were provided. The rail is of steel, light and strong—weighing about two lbs. to the foot, and supplies a long felt want, hundreds of tons of it having already been put into use.

Another Gigantic Wheel.

A company has been formed in London under the name of The Gigantic Wheel and Recreation Towers Company, Limited, to construct and work a wheel somewhat similar to the celebrated Ferris wheel. It is to be erected at Earl's Court Exhibition, and the first length of one of the legs for the towers has been placed in position. The general design of the whole structure is by Lieut. J. W. Graydon, and the contract has been taken by W. B. Basset, managing director of Maudslay, Sons & Field. It is to be 300 feet in diameter, while the diameter of the Ferris wheel was 250 feet, and it will have accommodation for 1600 people, instead of 1368.

But it is not only in size that the Gigantic differs from the Ferris. The English wheel will be carried on two towers 175 feet high, having saloons on their tops and at intermediate stages, surrounded on three sides by balconies. Communication with the top of these towers will be by lifts as well as by staircases, and they will be connected by a passage running through the axle of the wheel. This is to be seven feet diameter, and will be built up of mild steel bars and plates; while in the Ferris wheel the axle is a solid steel forging, 32 inches diameter and 30 inches at bearings. There are to be 40 carriages, each 25 feet long, 15 feet wide and 10 feet high, accommodating 40 passengers. There will be eight stages from which they can be entered, so that the wheel will stop five times during each revolution, which will take about 20 minutes.



Under this heading is published all assignments of patents or partial interest in same, as on record in the United States Patent Office for the month ending May 28, where the consideration was \$2,000 and over.

Edward N. Avery and Charles A. Stayton inventors, to Morris Bros., of Oberlin Ohio; convertible Hay and Stock Rack. All rights for a part of the U. S. \$4,000.

Hiram Burnett inventor, R. O. Woodward assignor to A. S. Woodward. Paint. All rights for the State of N. Y. \$2,000.

Noble A. Boies inventor, to Samuel B. McClure of East Palestine, Ohio. Hoof-expanders. An undivided half interest. \$3,000.

Thomas H. Besse, inventor, Wm. B. McCann assignor to James N. Crosby of Scranton, Pa. Ice Cream Freezer. All rights for five counties in Pa. \$2,000.

Cornelius Callahan inventor, to the Cornelius Callahan Co., of Maine. Cut off for valves. Assigns all rights. \$2,000,000.

Robert E. Daniels inventor, to the Daniels Steel Railroad Tire Co., of Youngstown, Ohio. Metal Railroad Tires. All rights. \$4,500.

James Dowdy and Frank M. Cattern inventors, to Frank M. Cattern of Denver, Col. Electro Medical Injector. All rights. \$2,250.

James W. Dawson inventor, to Frank A. Brown, of Columbus, Ohio. Invisible Burglar Alarm. All rights. 2,000.

Cyrus Crabbs inventor, to James W. Ayres, of Parkton, Md. Fence. All rights for 30 counties in Kentucky. 3,000.

Henry C. Carter inventor, to the Carter Package Co. Cover for Butter Tubs. All rights. \$5,000.

Matthew F. Connett Jr. inventor, T. W. Harford assignor, to Joseph J. Hare of Clear Lake, Iowa. Hand Fence Machines. An undivided quarter interest in said invention. \$6,000.

Jno. W. Cook inventor, Chas. L. Ogle assignor, to James H. Richards, Woodburn, Oregon. Clothespins. All rights for four counties in the State of Washington. \$1,200.

Thomas Carroll inventor, to the Habinger Carroll Cash Register Co., of New Haven, Conn. Total Adding Cash Registers. Exclusive right to said invention. \$10,000.

Archibald Ford inventor, Lincoln Davis assignor, to The Consumers Gas Saving Co., of Minneapolis, Minn. Gas Regulator. All rights for the State of Minn., except one county \$20,000.

Robert J. Fisher inventor, to Alice M. Fisher, of Athens, Tenn. Type writing machines. An undivided two-thirds of all rights. \$5,000.

Arthur Greiner inventor, Sylvester B. Dickey assignor, to the Greiner Economical Cupola Co., of Chicago, Ill. Process of Melting Metal. All rights. \$56,000.

Albert Sanford inventor, to T. J. Lemon, of Seneca Co., Mo. Velocipede. One undivided fourth of all right. \$5,000.

Gregoire Scrivanow inventor, Irene Eldred assignor, to The Columbia Telephone Mfg. Co., of N. Y. Galvanic Battery. All her right title and interest. \$20,000.

Samuel L. Madden inventor, The Cyclone Digger Co., to Wm. B. Sams, of Louisville, Ky. Post Hole Digger. All rights. \$2,950.

James W. McDonough and Horace H. Eldred inventors, to the Columbia Telephone Mfg. Co., of N. Y. Telephone Switch. All rights. \$30,000.

Paul Gondolo inventor, Miller's Pennsylvania Extract Co., to the Philadelphia Mortgage and Trust Co. Tannin Extract. All its rights. \$5,000.

James W. Woodward inventor, Addison N. Boggs assignor, to James W. Woodward, of Harvey, Ill. Ice Cream Freezer. All rights for the States of Ohio and Michigan. \$5,000.

Zenas L. Palmer inventor, H. H. Gould assignor, to C. N. Grant of Bay Port, Mich. Wagon Jack. All rights. \$1,300.

Charles H. Pettay inventor, W. W. Alexander assignor, to S. M. Nease and H. T. Woodmansee of Pittsburg, Pa. Line Tighteners. All rights. \$8,000.

Grant Holmes inventor, to Robert Holmes, of Danville, Ill. Steam Shovels. Undivided half of his right. \$20,000.

Thomas J. Hatfield inventor, F. C. Benson assignor, to W. R. Borders and others, of Randolph Co., Ill. Fanning Mills and Grain Cleaner. All rights for the State of Ky. 3,000.

Sarah M. Hoyt inventor, to The U. S. Washed Gravel Co., Ill. Centrifugal Screens. All rights for the U. S. 2,500,000.

Henrietta Horn inventor, Wm. C. Huss assignor, to Morris G. Greenwood and Earnest V. Pierson of Newark, N. Y. Garment Fitting Machine. One-half interest of all rights. \$8,000.

Geo. E. Landis inventor, to James Germanesen, of Portland, Oregon. Animal Gun Trap. An undivided half interest. \$1,500.

Zachary M. Lindley inventor, to Thomas A. Rogers, of Carthage, Mo. Washing Machine. All rights for Eleven States. \$10,000.

Mark J. Liddle inventor, to C. M. Graves and Charles Hoffman. Stove Pipe Drum. All rights

for the U. S., except the States of Michigan and Washington. \$10,000.

Samuel W. Ludlow, inventor, Geo. W. Losh, and others assignors, to the Louisville District Telegraph Co., of Louisville, Ky. Fire Alarm Apparatus. All rights for the State of Kentucky. \$5,000.

Cyrus W. Noble, inventor, to Geo. G. Gifford, of Auburn, Maine. Device for Coupling Chain Links. All rights for the State of Pa. \$2,000.

Charles A. Potts, inventor, to Edward A. Clair, Camden, N. J., Combined Clothes Line Prop and Clothes Hanger. All right, title and interest for the States of New York, Pennsylvania, Maryland and District of Columbia. \$2,200.

Industrial Notes.

At Muncie, Ind., on the 9th ult., fire destroyed the factory of Wm. N. Whiteley; loss \$200,000.

The lack of coal has caused hundreds of manufacturing concerns to shut down temporarily.

The Lima Steel Casting Works at Lima, Ohio, burned May 8th; loss, \$300,000; insured for \$100,000.

The Howard Harrison Iron Co., Bessemer, Ala., will furnish the city of Philadelphia with 10,000 tons of 48-inch pipe.

Talmage's Tabernacle, Brooklyn, was destroyed by fire last month for the third time. It is asserted that the fire started from a defective wire in the organ.

A cut from \$3.30 to \$2.80 per ton in the price of swarth iron caused the puddlers in the works of the Union Iron and Steel Co., at Youngstown, Ohio, to go out on a strike.

The Bliss Engineering Company, Washington, has gone into liquidation. Liabilities, about \$3,400; assets, \$1,300. Dull times and bad collections are given as the cause.

On account of the excellence of the bark in Tennessee Chas. A. Schieren & Co., leather-belting manufacturers of New York, are establishing a large tannery at Bristol.

The various firms in the United States engaged in manufacturing asbestos have consolidated under the name of the H. W. Johns Manufacturing Company, New York.

Recent advices indicate great business depression in Argentina. It is reported that during the first ten days of May failures, with liabilities aggregating over \$20,000,000, occurred.

The working time in the Pennsylvania Railroad shops, Altoona, Pa., has been reduced from four days of nine hours to three days of eight hours each per week. About 6,000 men are affected.

On account of the strike in the Pullman car shops at Pullman, Ill., the Allen Paper Car Wheel Co. and the Union Foundry Works were obliged to shut down, throwing 300 men out of employment.

A strike started at the National Tube Works, McKeesport, May 14. The men asked a restoration of the 20 per cent reduction made in their wages in February. The butt weld boys, who are from 16 to 18 years old, got \$1.40 and now get \$1.10. Skilled men who got \$3.50 now receive \$2.50 or \$2.75. The company will close the mill rather than accede to the strikers.

Electric Flashes.

A double track electric road is contemplated between Buffalo and Niagara Falls.

It is said there will be no monopoly of the running of electric boats on the Erie Canal.

The St. Louis system of horse racing by electric light is to be introduced at Chester Park, Cincinnati.

Prof. Edwin J. Houston was re-elected president of the American Institute of Electrical Engineers.

In 1888 there were but seven electric street railways in the United States. Today there are over 500.

It is reported that a Frenchman has invented an electric mosquito bar which electrocutes insects which come in contact with it.

It is now reported that the Manhattan Elevated Railroad Company, New York, is giving the subject of applying electric power to its system.

For very good reasons the mayor of Baltimore vetoed the ordinance providing that street cars running in the same direction on the same tracks should at all times remain at least fifty feet apart.

The Brooklyn elevated railroads have found it necessary to plan for putting in elevators to lift passengers from the pavement to the tracks so seriously have the trolley lines diverted traffic from the elevated to the surface lines.

The great "bivalve" lens, constructed by Lepaute, of Paris, on exhibition at the World's Fair, was purchased by the United States government for \$10,000 and will be used with electricity as an illuminant, in the lighthouse at Fire Island, N. Y.

The tenth annual meeting of the American Institute of Electrical Engineers was held in Philadelphia May 15-18. There was a large attendance and a large number of intensely interesting papers were read. The total membership of the Association was shown to be just 800.

The Street Railway Gazette presents the report of the Boston Water Board on the corrosion of pipes by electrolysis in that city, in which it is shown that serious results are likely to occur in the various districts but that it still remains to be shown whether it is a serious factor in lessening the life of the piping system as a whole.

The Paris-Lyons Railway company has followed the lead of the Paris-Havre company and begun the use of electric locomotives. The former company has decided to abandon entirely steam as a motive power. The express trains of the Lyons company to Nice are now run by electric engines. One novel feature of the engines is that the entire fore part is wedge-shaped.

The strike on the electric street railways in

Brooklyn was caused by the refusal of the motormen and conductors to buy summer uniforms consisting of a Norfolk jacket and a yachting cap of white duck. The prices fixed were 90 cents for the caps, \$11.75 for the conductor's uniforms and \$5.75 for motormen's coats. The employees refused to pay for these suits on a salary of \$2 a day, and now the question is "what are the companies going to do about it?"

The New Printing Contract.

The contract for the photolithographing and printing of the Patent Office Gazette for the coming year was let to the Norris Peters Company on their lowest bid of \$95,731. The other bidders were as follows: Andrew Graham, Washington, \$123,347; Helm, of Baltimore, \$126,131; National Lithographing Company (the contractors for 1893), \$127,915, and the Capital Publishing Company, \$143,799. The bid of Norris Peters is considered a remarkably low one, and it is doubtful if there is any money in it—except for the government. For many years prior to the last period the Norris Peters Company did this work in a most satisfactory manner, and the manner of awarding the contract last year to the new firm has been the subject of much criticism and finally a Congressional investigation—which is still pending, but out of which nothing is likely to come other than establishing in the minds of the people the belief that the change was brought about through the influence of Josiah Quincy then of the State Department.

The World's Fair Buildings.

The Columbian Exposition Salvage Co., composed of the Chicago House Wrecking Co.; August Pollak; A. S. Deutsch & Co.; Northwestern Iron and Metal Co.; Ohio Iron & Metal Co.; and Seabers & Fernley, who bought the World's Fair buildings for \$80,000, are allowed until May 1, 1896, to tear down the buildings. Seventeen will be taken down in the next sixty days. The Agricultural, Manufacturers' and Machinery buildings will stand for some time yet, as negotiations are being made with certain railroads in regard to the purchase of the iron in these three buildings.

Who Has Back Numbers of Inventive Age?

THE INVENTIVE AGE wants the following back numbers and will be pleased to pay all expense of postage.

1889—Nos. 1, 2, 4, 6, 7, 10, 11, 12, 14, 15, 17, 22 and 24.

1890—Nos. 25, 27, 28, 29, 30, 31, 32, 33, 36, 37, 38, 40, 41, 43, 44, 45, 47, 48, and 50.

1891—Nos. 51, 52, 54, 55, 59, 64, 72, 73, 76.

1892—Nos. —67, 78, 81, 88, 94.

1893—January, May, June and July issues.

Advise us by postal in advance of what numbers you will send and we will forward stamps for mailing.

THE INVENTIVE AGE,
Washington, D. C.

An Extraordinary Offer.

THE INVENTIVE AGE has made arrangements whereby it can furnish the complete set of World's Fair views—229 in all—at a nominal figure. These views are not cheap wood cuts but fine half-tone cuts covering every important feature of the greatest of the world's exhibitions. THE INVENTIVE AGE one year, and this set of views will be sent to any address, postage paid for \$1.35.

Still another great offer is that of the People's Atlas of the world—maps and statistics corrected up to 1884—124 pages—maps of every state and every nation—a complete Atlas, with over 300 illustrations, usual price \$3 to \$5. We will furnish THE INVENTIVE AGE one year and send the Atlas to any address, postage paid for \$1.35. Reliable agents wanted in every county in the United States. Send for terms to

THE INVENTIVE AGE,
Washington, D. C.

Test of Armor Plate.

The naval authorities recently made a test of some of the heaviest armor plate for the new coast defense vessels, and although not submitting the plate to the most severe test—that of resisting a shell from one of the new 13-inch guns—it was badly shattered. It is claimed that the plate tested was not a perfect one; that it had shown peculiar action while undergoing the Harvey process of hardening. On the other hand some experts believe that this test demonstrated the impracticability of Harveyizing plates of 18-inch thickness. Another test is to be made, however, in order to determine the efficiency of the new plates and the power of the 13-inch guns, the test referred to having been made with a 12-inch gun.

MAJ. JOHN W. POWELL, of Illinois, director of the United States Geological Survey for the last sixteen years, has voluntarily resigned on account of ill health, and his resignation has been accepted, to take effect on July 1. Prof. Charles D. Walcott, of Utica, N. Y., the present chief geologist of the survey, has been appointed his successor.

THE Correspondence School of Technology, Brainard block, Cleveland, Ohio, has issued a catalogue of its courses of instruction which will be of value to every one interested in this modern method of education.

E. KENARD MITTING, technical chemist, Chicago, announces that he has removed from 423 Superior street to 416 Huron street.

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FOR SALE.—My patent No. 516,973, dated March 20, 1894, "Improvement in Type Writing Machine." A very meritorious invention. Address, Christian Hess, box 727, Steelton, Pa.

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A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE, which keeps inventors posted in the art in which they are mostly interested. — The full address of any patentee, and number of patent found below sent to any address on receipt of one 2-cent stamp. — We will send, postpaid, to any address, printed copies of any U. S. patents, with specifications and drawings, upon receipt of 20 cents for one copy; 35 cents for two copies; 50 cents for three copies. — (See premium offer elsewhere in this issue.) — Address THE INVENTIVE AGE, 8TH AND H STS., WASHINGTON, D. C.

LIST OF PATENTS

GRANTED FOR INVENTIONS,

MAY 1st, 1894.

[See note at head of this list.]

- Acid, apparatus for charging liquids with carbonic. J F Theurer.
 Acid, petroleum sulfo 2. H A Frasch.
 Animal liberating device. C C Partridge.
 Ash screener. C Eberle.
 Axle box dust guard, car. N H Davis.
 Bag and twine holder. R J Morton.
 Bale covering. M A Heath.
 Band cutter and feeder. E Turnell.
 Band cutter and feeder. W S Van Wechel and D M Wynia.
 Barrels to stocks, detachably securing. L L Hepburn.
 Basin, wash. J F Lamping.
 Battery system, storage. J Trunpy.
 Bed, folding metal 2. A D Houston.
 Bed, sola. E Sodergren.
 Bedstead attachment. E Brule.
 Beer, apparatus for pasteurizing and racking off. A O Muller and A Giesen.
 Beer with carbonic acid, impregnating. J F Theurer.
 Bicycle. C E Ford.
 Bicycle. E J O'Connor.
 Bicycle bag. B Elliott.
 Bicycle chain adjustment. M L Wilcox.
 Bicycle gearing. E L Shultz.
 Bicycle stand or holder. R de Clairmont.
 Bit stock. F J Colvin.
 Blower, powder. R E Warner.
 Boiler. W H Berry.
 Boiler. P B Collier and J H Dignard.
 Boiler. C S Hopkins.
 Boiler covering. W A Scott, Jr.
 Boiler furnace, steam. J McMillan.
 Boiler tube cleaner. M C Henley.
 Boiler tube expander. H Strecker.
 Boiler tube expander and stopper. J Watson.
 Boot protector, lady's. H J Wescott.
 Boot, soaking. M N Rogers.
 Bottle, mangle. E Terry.
 Bottle or jar closure. R M Howe.
 Bottling machine. M P Heddy.
 Box blocking machine. C Cristadoro.
 Bridge gate. J Sego and C Faucher.
 Bridle bit. T D Gordon.
 Brush, fountain marking. R G Bailey.
 Buckle. J A King.
 Bung extracting machine. J U Kraft.
 Burglar alarm. H A Moore.
 Burial apparatus. A E Whitney.
 Camera shutter. L F Eiden.
 Can filling apparatus. G H Perkins.
 Can filling machine. A J Tanner.
 Car coupling. H Bridge.
 Car coupling. P C Brown.
 Car coupling 2. J Comp.
 Car coupling. J W Lang.
 Car coupling. D D Nolley.
 Car coupling. R J Reynolds and G M Jones.
 Car coupling. C H Smith.
 Car coupling. W V Wolcott and H O'Hara.
 Car dumping apparatus. P H Hageney.
 Car fender. S C Kindig.
 Car platform gate. J Krichbiel.
 Car safety guard, street. J Norton.
 Car switch actuator, street. F Sparling.
 Car wheel guard or fender. J F Morton.
 Cars, curtain rod fixture for sleeping. J Kirby, Jr.
 Check book. P F Cavalier.
 Cheese forming machine. H R Van Eyck.
 Cigar box. L R Seinfeld.
 Cigar press. C Schuppel and C Huber.
 Cistern cleaning machine. J Shepherd.
 Clasp. P James.
 Clay pigeons, machine for manufacturing. W G Jones.
 Cloth folding machine. W A Richardson.
 Cloth sizing and drying machine. R Partington.
 Clothes drier. R Douglas and J F Austin.
 Catch, automatic stop. A C Campbell.
 Coffee pot and filter. C H Huxford.
 Coin tray. H A Hayden.
 Commutator brush. R Kersberg.
 Converter 2. C M Allen.
 Converter for smelting ores. C M Allen.
 Copper from its ores, extracting. G W Goetz.
 Copy holder. R Sheldon.
 Core making machine. C R Schmidt.
 Cotton press. F L White.
 Cracker cutter. L A Rockwell and W A Hall.
 Crate. H Allen.
 Creamer, centrifugal. O Ohlsson.
 Cultivator and planter. J E Miller.
 Cultivator, lister. F P. Craig.
 Curtain fixture. I Williams.
 Cutting machine. P E Wilson and P M Hesch, Jr.
 Cutting off tool. E W Goerd.
 Dairy, portable. J H McIlveen.
 Darning and embroidering frame. G P Hill.
 Dental chair. T H and E Gardner.
 Dish, butter. R Hill.
 Dish cleaner. F Noble.
 Disinfecting apparatus. J L Stratton and F Murdock. (Reissue.)
 Distilling apparatus. A Lavy.
 Dough shaping machine. F Duhirkop.
 Drill for wells, &c. C E Wyman.
 Drying kiln. C H Seaman.
 Dye, blue alizarin. R Bohn.
 Dye, brown petroleum. H A Frasch.
 Dye, brown petroleum nitro. H A Frasch.
 Dye, petroleum. H A Frasch.
 Electric conductor for underground conduits. D E Conner.
 Electric elevator. F E Herdman.
 Electric generator. W Baxter, Jr.
 Electric generator, self exciting constant potential. A Schmid and B G Lammie.
 Electric heater. S B Jenkins.
 Electric machine, dynamo 2. G Forbes.
 Electric machinery, construction of solenoids or coils of wire used in. G Forbes.
 Electric motor. F E Herdman.
 Electric motor. E E Ries and G J Scott.
 Electric motor controlling apparatus. F E Herdman.
 Electric motor controlling device 3. F E Herdman.
 Electric motor or generator. W Baxter, Jr.
 Electric motor regulator. F E Herdman.
 Electrical distribution, system of. E Thomson.
 Elevating and bag holding machine, portable. G S Ingle.
 Elevator. F E Herdman.
 Elevator. G Quackenbush.
 Elevator controlling device. F E Herdman.
 Elevator for buildings. C I Hall.
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 Engine. P Chontean.
 Engine tender, road. E T Wright.
 Envelope. A J Ritter.
 Evaporating pan. H F Miller.
 Excelsior cutting machine. C H Whitman.
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 Exhibiting machine, coin controlled card. J McFarland and G H Reid.
 Fan, sewing machine. J F Billman.
 Faucet. M E Spofford.
 Fence winding device, wire. I V Adair.
 Fences, implements for weaving filler wires in wire. L A Greeley.
 Filter. C Sellenscheidt and L Lepke.
 Fire alarm and signal, automatic electric. L A and C J Werner.
 Firearm, recoil operated. P Darche.
 Fire escape truck. E Cardarelli.
 Folder for fabrics, edge. R W S Mitchell and J Murphy.
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 Folding machine. C Eframson.
 Forge, blacksmith's. G E Post.
 Fuel economizer. J Milne.
 Furnace charging apparatus, blast. F C Roberts.
 Furnaces, cold air draft regulator for. A H Zimmerman.
 Game apparatus. M M Wilson.
 Game bag. G H Rawlings.
 Game board. W Hoffman.
 Garment supporter. G W Parker.
 Gas apparatus, water, 2. A G Glasgow.
 Gearing, electromagnetic variable speed. W W Beaumont.
 Glass door plate. H W Green.
 Glass panels, manufacture of stained. H C Hughes.
 Glassware molding apparatus. C Grebe.
 Globe, geographical. T and M A Hodgson.
 Glove &c. H L Northrop.
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 Handles and covers to vessels, attaching. G W Niedringhaus.
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 Harvester. W D Harmon.
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 Hinges, manufacture of strap. T Corscaden.
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 Hoisting apparatus. W Roth.
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 Hot air furnace. G W Fridrich.
 Hub protector, vehicle. N D Hodgkins.
 Incubator. H R Davis.
 Indicator springs and steam gages, apparatus for testing. R C Carpenter.
 Ink, manufacture of printing. J and J Bibby.
 Insulating material into conduits, means for introducing. D Brooks, Jr.
 Jewel setting machine feeder. W Rundquist.
 Knife. R J Christy.
 Knife handle brush back, &c. F N Look.
 Knitting machine, circular. J L Branson and S S Cook.
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 Ladder for sleeping cars, folding. J B Holbrook.
 Ladder, sectional. H H Lang.
 Lamp, electric arc. J C Fyfe.
 Lamp, electric arc. J B McKeown.
 Lamp, incandescent electric. F S Smith.
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 Last. F E Benton.
 Last. J C Kupperle.
 Latch and lock, combined. N B Gregory.
 Lathe, turret. F H Richards.
 Laundry hanging rod. W S Coburn.
 Leather skiving machine. N Dufresne.
 Life preserver buoy, &c, automatic. R Colomes.
 Liquid separator, centrifugal. J L Jonsson.
 Lubricant for bicycle chains and bearings. W L Sargent.
 Lubricating device for car or other axles or shafts. J S Washburn.
 Lubricator. P S Whiting.
 Magnet for electric machines, field. A Schmid.
 Mail box. J G Cutler.
 Mailing machine. J A Horton.
 Malt liquors, apparatus for cooling and aerating. H E Deckelach.
 Match making machine. J C Donnelly.
 Match safe. R D Goodlett.
 Mattress filling machine. W H Putnam.
 Measuring dress skirts, device for. A S Newcomb.
 Measuring implement, tailors. D Hawley.
 Measuring textile fabrics, apparatus for. F C Stephan.
 Meat chopping machine. A J Kull.
 Metal, machine for joining and rolling sheets of. W S Grafton and R R Spears.
 Mold making machine. L Ribereau y Martenau.
 Molder's rack. F Schulte.
 Mop wringer. W H Bennett.
 Motion, device for converting reciprocating into rotary. F Jackson.
 Motors, hydraulic apparatus for controlling fluid-pressure. C Bonjour.
 Mower. R McGahey.
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 Nut lock. T McDonald, Jr.
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 Sleigh. S E Oviatt.
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 Smelting ores. H Lang.
 Smoke consuming furnace. T Dark, Sr.
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 Sold leveling and burnishing machine. E C Judd.
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 Toe weight. J D Keller.
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 Clothes line fastener. C S Buckwalter.
 Coal drill. G H Bittenbender.
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 Coffin attachment. C D Shrader.
 Coffin handle. L G Kregel.
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 Cultivator attachment. J Meier.
 Cult vator, straddle row wheel. J I Hoke.
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 Current transformer, alternating. C S Bradley.
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 Dish cover. T York.
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 Door bolt, double. W Johnston.
 Dredge bucket. A W Robinson.
 Driving mechanism. P Ashberry and W Barnes.
 Dye, polyazo yellow. J J Brack.
 Dye, polyazo yellowish. J J Brack.
 Dyeing machine. G H Craven.
 Ejector and mauling mechanism. J A Rosenberg and J Hirst.
 Ejector, fluid. N Power.
 Electric accumulator or secondary battery. A J Smith.
 Electric currents of high potential, generating and utilizing. C S Bradley.
 Electric motors, operating. J S Bancroft.
 Electric switch. J F McElroy.
 Electrolysis. H Blumenberg, Jr.
 Electromagnetic tool. C F Carpenter.
 Elevator controller. W C Smith.
 Engine attachment. D R and F M Woodsum.
 Entrails, machine for en.
 H Reynolds and F Ebert.
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 Envelope and stationery case. N Hebr.
 Excavator. J Oie.
 Exhibiting device, automatic. B J Smith.
 Exhibitor, window shade. J Sturgis.
 Fan. M Rubin.
 Fastening device. B S Hoyt.
 Faucet. W J Oswald.
 Faucet attachment. J Bolgiano.
 Faucet, can. W A James.
 Fence. O E Churchill and C W Bennett.
 Fence machine, wire. A J Forsythe.
 Fence, metal. G D Hamilton.
 Fence post base. J H Cooper.
 File, letter or bill. G H Dietz.
 Filter. F Bonmarinus.
 Filter. C E Chamberland.
 Fire alarm transmitter, electric. A Dnnish.
 Fire escape. D N McLeod.
 Fire escape. C A Sturtevant.
 Fire escape ladder. W O Ellis.
 Fish hook. H S Goff and A B Judkins.
 Flush tank, automatically actuating. B Williams.
 Flushing tank. J Maloney, Jr.
 Folding table. E G Chormann.
 Fruit picker. B A Wright.
 Furnaces, construction of puddling or other. J L Smith.
 Furnaces, promoting combustion in. J B Davids.
 Gage for bias cutters. N Steen.
 Galvanic battery. C W A Hertel.
 Game board. J B Davids.
 Game or amusement. J B Davids.
 Garment, body. F W Warner.
 Gas burning furnace for steam boilers. G E Belmor.
 Gasket. T Saunders.
 Gear, bevel. G B Grant.
 Gold washer. H W Murdock.
 Governor. A J Pierce.
 Governor, automatic. W Cooke.
 Grease trap. I Heffron.
 Grille work, ornamental. F M Carr.
 Guns, safety breech lock for. J B G A Canet.
 Harrow, riding. W F Cochran.
 Harvesting machine knottor. J F Steward.
 Heater. J F Adams.
 Heating apparatus, oil vapor. E Strass.
 Hinge for step ladders, &c. J and C Koehler.
 Hoist, pneumatic. H Schweim.
 Holback. D Warner.
 Hook and eye. F Meyers and M Stoveken.
 Hoop dressing machine. H F Campbell.
 Horse shoe, sectional. E Hogbin.
 Hose coupling band, adjustable. E R Arthur.
 Hydrant. R A Brooks.
 Hydrocarbon burner. E Betz.
 Hydrocarbon burner. T K Nickersen.
 Hydrocarbon burner. R Reid.
 Ice, manufacture of artificial. R M Taylor.
 Index. F P Sweitzer.
 Insect powder distributor. S E Hotchkiss.
 Ironing board. J Y Moore.
 Jeist crowning machine. F J Randall.
 Keg or analogous package. F H Waite.
 Kiln for baking bricks, tiles, pottery, &c. T T Polivka.
 Knitting machine, stop off motion. F Chambers and T Dond.

Lamp carbon holder, arc. E Lavens.
Lamp, miner's. W P McMasters.
Lamp, rotatable signal. F W Dressel.
Lantern, hurricane. W Lightbody.
Leg, artificial. W R Honsuckle.
Letter box. S A Groff.
Lighting implement. W H Shepard.
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Locomotive, compound. C J Mellin.
Loom Jacquard attachment. S Bentley.
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Lumber drying apparatus. G T Schultze.
Measuring instrument, distance. J L Buford.
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Molds, apparatus for forming sand. R Richter.
Mop or brush holder. A D Grainger.
Mortar, producing hydraulic. C Bloemendal.
Mortising machine. J Holmes and K Petersen.
Mower sharpener, lawn. I Adams and J H Boswell.
Musical instrument tail piece. R L Turner.
Necktie fastener. C McNeil.
Nut, axle. J S Deats and T R Stewart.
Odometer, adjustable. T Schroeder.
Oil from cotton seed, apparatus for extracting. W T Forbes.
Oil storing and feeding apparatus. L C Snell.
Ore roasting furnace. H F Brown.
Ore, utilizing from. J Reese.
Organ, reed. J W Trainer.
Organs, automatic coupler for pneumatic. J V Pilcher.
Oven shelves, device for operating. F Kampen, Jr.
Overcoat. B F Cassaway.
Overshoe attachment. A J Barber.
Oxygen, apparatus for making. F Fanta.
Packing, metallic. P W Willans.
Pan lifter. W Reisse.
Pantaloons protector. L D Jones.
Paper bag. E Thompson.
Paper bag machine, 2. W B Parvis.
Paper box. R Gair.
Paper box blanks, machine for bending. C W Gay.
Paper box machine. C W Gay.
Paper folding or plaiting machine. W L Allen.
Paper, method of and machine for feeding. R S Oder.
Paper roll holder. C H Faine and N S Hoffmann.
Paper vessels, fastening device for. W Foglesong.
Photograph. S D McKelvey.
Phosphate rock, apparatus for treating. R E Rose.
Photographic plate, 2. T C Roche.
Pianoforte repeating mechanism. H Maurer.
Pianos or organs, wrist supporting hand guide for. G Heimrich.
Pill machine. A G Brown.
Pipe, device for filling joints of metal. J F Gleason.
Pipe fitting apparatus. J W Cooney.
Pipe hanger. A Bryant.
Plaster, composition of matter for. J D Preston.
Plug strip, multiple. H G Rounds.
Pottery, machine for forming oval ware. A Lowry.
Powder holding and delivering device. J C Michael.
Printing press, multicolor, 2. W C Wendte.
Pulley. P Conyngnam and W R Gibbons.
Pulley, separable. A C Hodge.
Pulverizing manure. J F Haygood and J H Roach.
Pump governor, feed. J Thomas.
Pump, hand. J Clark.
Pump motor. L H Lloyd.
Pump rods, brace and guide for windmill. A S Trzechon.
Punching tool. F P Brooks.
Quill stripping cutting machine. E Bluthen.
Racking apparatus, beer. H Torchiani.
Racking beer, method of and apparatus for. A Werner.
Railway brake operating apparatus. R A Kiskadden.
Railway, conduit electric. J F Cook.
Railway, contracting device for electric. D F Graham and W T Allen.
Railway frog. D Horrie.
Railway spike. G W Thompson.
Railway switch. C F Wilson.
Railway vehicle skid. J Barthelness.
Ranite or other fibrous growths, apparatus for treating. W T Forbes.
Ranite treating apparatus. W T Forbes.
Razor, safety. E L Schultze.
Razor strap composition. J Hessel.
Reflector, adjustable. P W A Pasch.
Refrigerator ice rack. F E Ranney.
Rein support. E W Craine.
Robe holder. F E Woodruff.
Rolling angle bars, machine for. A L Hammarberg and A Berglof.
Rule, plumb. F Holt.
Safety apparatus. H K Whitner.
Sash fastener. J F Miltonberger, J S Wynant and C Schott.
Sash fastener, window. R Kirsch.
Sash holder. C Koenenmann.
Sash, window. S Puchs.
Saw set. W H Miller.
Saw set. C Whitus and J W Wilks.
Saw, stone. M Litchford.
Saw tooth, insertible diamond. R Marquart.
Scales, pivot bearing for platform. E Tannewitz.
Screw making machines, device for separating turnings from finished screws in. J A Bidwell.
Seaming sheet metal cans, mechanism for. J A Steward.
Seed delinting machine, cotton. J H McCormick.
Self waiting table. R Hogg.
Sewing machine. J T Jones.
Sewing machine shuttle cop holder. J T

Jones.
Sewing machine thread gripping mechanism. W A Mack.
Shade fixture, window. H R Smiley.
Sheet metal flanging machine. J Carroll.
Sheet metal stamping machine. L L Sagen-dorph.
Shipping case. J M Leaver and E J Vance.
Ships, form of. A Foerste.
Shoe. B Scarinci.
Shot spreader. H E Winans.
Shovels, spades, &c., attachment for. T Walsh.
Skins, process of and apparatus for unhairing. C L Pnuch.
Sled propeller. O H C Voigt.
Smoke consuming furnace. M Fulton.
Smokeless furnace and stoker. J E Schlieper and J H Harrison.
Snap hook. C B Bristol.
Soda apparatus, automatic heat regulator for hot. J W Tufts and W Helmer.
Soda fountain, 2. T C Riley.
Spark arrester. A Hasper.
Spectum. M Wertheimer.
Spinning and doubling machines, spindle and support for. J Hargreaves.
Spinning machinery. E K Baker.
Spool support. T C Dill.
Staple, roller. O P Scrivner.
Steam boiler. T A Marriott.
Steam boiler or hot water heater. A Boyce.
Steam engine. H M McCall.
Stone and ore crusher. C G Collins.
Stop motion. S B Westcott.
Stove for heating street cars. M K Bowen.
Straw stacker. J W Nethery.
Straw stackers, deflector for pneumatic. F F Landis.
Straw stackers, mouthpiece for pneumatic. F F Landis.
Tap for drawing liquids from cask. P C Leidich.
Target trap, self feeding. H W Tichenor.
Telegraphic or telephonic transmission, apparatus for. M I Pupin.
Telegraphic, telephonic, or other electrical systems, transformer for. M I Pupin.
Temperature annunciator, electrical. E Kloss.
Tension regulator, automatic. W A Power.
Thill coupling. J E Fisher.
Thill coupling. F V Ziegler.
Thrashing machine. A M Lockhart.
Tire, bicycle. J J G Smith.
Tobacco casing machines, spraying device for. J C Frost.
Tobacco, machine for preparing and casing. C L Marlburg.
Tobacco pipe. A J Pugh.
Tomb, mold for concrete burial. W W Reeves.
Tool, combination. T Harris.
Tool for carriages, combination. J A Rior-dan.
Towel rack. S T Axtell.
Toy bank. D R Reynolds.
Trace cutting and trimming machine. H A Dodge and W T Richards.
Transplanting machine. A W Stephens and L D Swart.
Transportable elevator for goods. D Part and T R Parker.
Toner and embalming needle, combined. L C Kregel.
Trolley tracks, switch for overhead. C G Schmidt.
Trolley wire crossing. E H Allen.
Trolley wire hanger. A B Crounce and C A Rutledge.
Trolley wire hanger. C F Strasburg.
Trunk. B Dickenson.
Trunk attachment. C W Clifton.
Trunk strap fastener. P Mundry and H Pontier.
Tubular metallic post. W and C Andrew.
Type writing machine. W Clark.
Type writing machine. G L Rawdon.
Typographic machine. E Werner.
Typographic machine and attachment. E Werner.
Urinal, ventilated. F P Smith.
Valve, air and gas meter. J Sherman.
Valve for air brakes, tripple. H M Lofton.
Valve, hydraulic, 2. E S Mathews.
Valve rod, slide. J H Shepherd.
Valve, throttle. B Clark.
Vehicle wheel. H N Parker.
Vehicles, elastic storm apron for. W M Blanchard.
Vending machine. F G Dietrich.
Vending machine, coin controlled. A Keith.
J P Threll and J W Willard.
Voting machine. W M Cutter.
Wagon, dumping. J A Klees.
Water column, safety. H Engel.
Water heater, gas. S Stewart.
Water wheel governor, electrical. E P Wetmore.
Welding machine, electric. H Lemp and C G Anderson.
Well casing rig, oil. C C Stover.
Well drilling apparatus. S A Horton.
Well or cistern cleaner. J Miller, Sr.
Winding engine. H L Reynolds and H W Ketchum.
Windmill. J Wallace.
Window frame sash. M E Knight and A B Harrington.
Window screen. A Thomas.
Wire barbing machine. I A Kilmer.
Wire stretching machine. W A Lambert.
Wool washing machine. W and A W Blackburn.

PATENTS GRANTED MAY 15, '94.

Adding machine. A B Lennox.
Anvil vise attachment. A F Reed.
Antographic register. J A Marsh.
Awning lifter. O H Thompson.
Axle, carriage. C H Palmer.
Bagatelle table. W R Fearn.
Band cutter and feeder. P Linscheid.
Bandage for varicose veins. A Schutz and A Landner.
Bank or money changer, automatic. H F Sloenn.
Bath sprinkler, detachable. J H Stevens, Jr.
Bearing, roller. F Mossberg.
Beer condensing and bottle filling appar-

atus. G W Farrell.
Beer cooler. H Hahn.
Bell, signal. W S Adams.
Bicycle. C E Whitaker.
Bicycle brake. E S Still.
Bicycle brake mechanism. W H Binns.
Bicycle frame. L M Wainwright.
Bicycle gear. E J Swedlund.
Blower, fire. T O Payne.
Boiler. O C Davis.
Boiler feeder. P Hellmich.
Boiler furnace. W Braud.
Book backing machine. A L Garver.
Book, check, receipt, or other stub. H Loewenbach.
Boot tree. G H Stephens.
Bottle closing device. R A Wittmann.
Bottle or can case. J H Nellis.
Bottle stopper. P M T Imband.
Bottle stopper. C and B Schramm.
Brake mechanism, hydraulic. J Keller.
Brick machine. J D Pace.
Brush. A W Hahn.
Brush binder, paint. T W Frost.
Bubbles, composition for blowing soap. E E McNaughton.
Bucket hoisting and tripping apparatus. W E Ludlow.
Buckle. C R Harris.
Buckle fastener. W B H Dowse.
Bundle carrier. W W Burson.
Butter extractor, centrifugal. G M Anderson.
Button. W S Godfrey.
Buttons to garments, machine for attaching. D A Carpenter.
Calculating machine. J A Sewell.
Car brake. K G Ficke.
Car coupling. T P Carroll.
Car coupling. G W Dickey and T A Harding.
Car coupling. T Johnston.
Car coupling, 2. R F Ludlow.
Car coupling. J W Unruh.
Car fender, street railway. J B Bailey.
Car sanding device. I Mowder.
Car provided with fenders. A H Jelly.
Carding engines, apparatus for controlling the grinding of flats of. J E Prest.
Carving machines, frame for supporting patterns and material for. C S Yarnell.
Cash register and indicator. W T McGraw.
Casket handle, detachable, 2. L H Bannister.
Centrifugal machine. H E Smith.
Checkrein loop. M J Clark.
Chimney cowl. J A Hodel.
Churn. W H Thomas.
Clay product machines, die or mold for. W W Wallace.
Clothes pin. S German.
Clutch. S P Babcock.
Clutch, friction. T A Hayes.
Coal dust firing apparatus. C Wegener.
Coin controlled machine. W M Ducker.
Compression joint. C S Bayer.
Conveying and automatically delivering small articles, apparatus for. A Muller.
Copy guide. W Duchemin.
Corn husker. J P Schurkens.
Cover, dinner pail. H E Dunham.
Cultivator or seed planter. L Kirlin.
Curtain rod. W H Edsall.
Curtain roller. F and C Otto.
Dental chair, 5. A W Browne.
Die stock or holder. W D Putnam.
Fish drainer. M Reid.
Disinfectant cup. W L Gerard.
Door indicator. H B Diamond.
Draft equalizer. R M Le Grande.
Drier. A Blatchly.
Drum. C Koeth.
Dust arrester. H A Huefner and L Lash.
Dye, blue. J Schmidt and J Bachelut.
Dynamo, constant current. W H Elkins.
Ear for buckets, &c. M F Robeson.
Eraser. G W Tenfel.
Ejector, water. J H McGowan.
Elastic fabric. G C Moore.
Electric indicator. W E Garey.
Electrically governed switch. E H E Klatte.
Electricity generated by means of wind power, device for regulating. T A Willard.
Elevator. C W Baldwin.
Elevator safety device. G C Howard.
Ellipsograph. W Lehner.
Embossing machine. F W Maley.
Enameling sheet metal and compound therefor. H D Quimby.
Engines, reversible eccentric for. D W Kellogg, (reissue).
Envelope. W H Eldridge.
Envelope. G H Martin.
Evaporating apparatus. T J Rayner.
Eyeglass holder. T King.
Fare indicator for cabs. O Schneider.
Fastener, adjustable. J A Boyer.
Fat, compound edible. A W Winter.
Faucet, beer. G A F Streuber.
Feeding and watering live stock, device for. A C Winch.
Fence. D D Frisbee.
Fence. D H Talbert.
Fence, wire. J W Buchanan.
Fence, wire. E L Schanck.
Fence wire tightening device. H Buck.
Fences, tool for building wire. L C Highsmith.
File holder. J Roust.
Fireproof curtain for elevator shaft. E F Clarke.
Fires, process of and compound for extinguishing. A C Schumacher.
Fires from houses, apparatus for expelling. R F Lotspeich.
Fly trap. W Thoma.
Fork attachment. E S Lane.
Fruit clipper. T K Godbey.
Fruit stoner. J Boeri.
Furnace grate. W R Roney and O A Stranahan.
Furniture, combination. E L Still.
Furniture, folding. S Aufrecht.
Game apparatus, bubble. E E McNaughton.
Garment hanger. N Neilen.
Gas burner for heaters. A T Welch.
Gas engine. D C Luce.
Gas engine. H Swain.
Gas holder tank. F Mayer.
Gas regulator. T G Lewis.
Gate. W J Slack.
Glue pot, steam heated. F N Hastings.
Governor. G J Altham.

Governor, steam engine. J P Devoissaud.
Greenhouse. H E Hall.
Grinding machine. R H Grant.
Gun mounting. D Adanson.
Hair from the skin, composition for removing. J Mellinger.
Hammock support or tent frame. W S Young.
Harrow. J C Johnson.
Harrow, machine for sharpening roller disk. T Ellison.
Harvester, corn. H Claar.
Hats by means of wire staples, machine for attaching sweat leather and bands to. F W Cooper.
Hay frame brake. F H Hoch.
Heel stiffener machine. W J Young.
Hinge, spring. R Brindle.
Hitching device. J P Muth.
Hoof boot and pad. W Sidebotham.
Hose coupling. S M Beery.
Hub, wheel 2. J W Cloud.
Inseam trimming machine. A P Hanscom and A C Spencer.
Iron, refining. A E Barton and G B McCormack.
Ironing machine. H E Smith.
Jointer guard, automatic. C A Daly.
Kiln for burning earthenware. W H R Kuntzman.
Kneader and mixer, dough. R M Shaffer.
Knee protector. A C Bull.
Lacing stud fastener. P A Raymond.
Lacing studs, process of and device for attaching. P A Raymond.
Lamp 4. E F Trent.
Lamp burner. L A Milbank.
Lamp, electric arc. J F Kester.
Lamp, electric arc. W Mathiesen.
Lasting machine. J Blakey.
Lasting tool, hand. I Frette.
Lathe, screw cutting engine. W P Norton.
Lathing, metallic. G Hayes.
Lead salts from native ore, obtaining. A G Fell.
Leaf turner. L Swindle.
Leather skiving machines, circular knife for. A J Tewksbury.
Light concentrator for dentists, surgeons, or others. W H Thrift.
Lighting system, alternating current arc. T Spencer.
Liquid mixer. J B Thies.
Loading apparatus. H N Carpenter.
Loading machine, dirt. J M Younger.
Loom, Swivel. H and P D Westerhoff.
Looms, shuttle operating mechanism for narrow ware. A Weimar.
Magnetic engine for reciprocating tools. H S McKay.
Maps, &c., revolving holder for. A B Fretz.
Match safe. A Hansen.
Medicine, time indicator for taking. O Kettmann.
Metal shaping and planing machine, reversing mechanism for. A F Champlin.
Metal strips, machine for cutting and finishing. T Brandt.
Metallurgical furnace. J Butler.
Milk, method of and apparatus for preserving condensed. F H Smith.
Mining tool. M Harbsoeg.
Mop head. H F Low.
Motion, electric mechanism for giving reciprocating. H S McKay.
Motors, hand regulator or switch for. E E Keller.
Motors, method of and means for starting synchronous. B G Lamme.
Mower, lawn. S P Graham.
Musical instrument. H Langfelder.
Musical instrument. F A Richter.
Musical instrument, stringed. H E Wur-litzer.
Nail or spike. J Floyd.
Nozzle, steam jet. L Schmitte.
Obstetrical apparatus. W Jackson.
Oil burner. C C Baldwin.
Ore concentrating apparatus. W L and F S Card.
Ores, refining. A E Barton and G B McCormack.
Organ. J Polkanis.
Package for containing ices, &c., hermetically sealed. C L Dexter.
Paper bags, making. W A Lorenz and E E Claussen.
Parker, vegetable. A M Mundell.
Patterns, method of and apparatus for marking. L Schaefer.
Pavement ornamenting device. M Maurer.
Paving block. J L Pope.
Pedal. A Perkins.
Pen. A M Henry.
Photograph apparatus. Coin-controlled. J A Parsons.
Photographic vignetter. J B Walker.
Piano muller. O H Bollman.
Piano or organ, upright. W T Smith.
Planing machines, feed roller for wood. W N Sawyer.
Plant setter. H M Hodson.
Planter, seed. L D Benner.
Plaques of india rubber, &c., forming tubular. W Barr, Jr., and D. McKay.
Plow iron clamp. W A Clark.
Pneumatic dispatch tube gate. S F Leake.
Pneumatic dispatch tube system. S F Leake.
Poke, animal. F Fisher.
Pot or kettle. E Gerber.
Powder distributor. C H Leggett.
Powder, manufacture of smokeless. F G du Pont.
Powdering plates, &c., machine for. B Bangh.
Printing and dividing endless lengths of paper, machine for. C E Preusse.
Printing machine for copper or steel plates. J Laviere.
Printing machine, rotating letter press. F X Holze.
Propeller, pneumatic. L H Mayer.
Pulley block. A W Browne.
Pump and motor therefor. A T Welch.
Pump, direct acting steam. F A Burnham.
Pump valve, steam actuated. J T Hayden.
Pumping apparatus, portable. D Noble.
Punching bags, apparatus for sustaining. J P MacLearn.
Purse or coin receptacle. A Goertz,

Puzzle. H L Cassard.
Rail joint. E P Caldwell.
Rails, bars, &c., implement for straightening. A Meuser.
Railway rails, substructure for. J M Price.
Railway signal, electric. F Beattie.
Railway signal, electric. R M Strong and C F Reed.
Railway switch, city. J Shutt.
Railway system, electric. D Mason.
Railways, contrivance for diminishing the danger to foot passengers from street. F Jernetz and F Jeniczek.
Rake. A R Dickinson.
Ram or engine, hydraulic. W A Rife.
Refrigerating machine. J E McLaughlin.
Refrigerator. R Hirsh.
Releasing device. H Lahann.
Revolvers, cylinder pin catch for. J Ronrke.
Revolving chair. J M Morgan.
Rifle, flume. S A Baggs.
Riveting machine. J J Unbehend.
Sash balance. D Sinks.
Sash balance. J J Totman.
Sash fastener. J F Davis.
Satchel or bag. J Limbacher.
Saw clamp, circular. C C Newton.
Saw grinding machine. C C Newton.
Scraper. H G Butler.
Screw driver. A Mallock.
Screw press. F Mossberg.
Seeder and planter. J W Campbell.
Sewing machine presser foot. R G Woodward.
Sewing machines, end cap for cylinder. E C Holland.
Shade fixture, window. F M Wilkinson.
Shades or curtains, attachment for adjusting window. L Yancey.
Shaft support, fluid pressure. W Harrison.
Slicing machine. A and A Iske.
Smoke consuming furnace. J M Thomas.
Snow plow. H H Kryger.
Spark catcher. J F Christand.
Spinning spindles, device for plumbing top rail. J P Kelly.
Splint cutter. F S Banmeister.
Spring seat. F H Homan.
Sprinkler head, automatic. O Pierce.
Sprocket wheel. O Timm.
Steam engine. A N Ogle and C M Magnusson.
Steam engine. S and C L Torrey.
Steam engine, quick speed. J P Devoissaud.
Steam pressure gage. J F McElroy.
Steam shovel. G Holmes.
Stove. C C Free.
Stove and heater, combined. F K Wilcox and C E Vail.
Stump extractor. J H Rouse.
Surface gage. O C L Ekman.
Swage. C A Mette.
Switch and signal operating mechanism. N Ratcliff.
Telephone circuit. C E Scribner.
Thill coupling. C A Crowsaw.
Tile machine. W H Priddle.
Tire, bicycle. C J Spofford.
Tire, vehicle wheel. G S Webb.
Tires to wheels, device for attaching pneumatic. L H Brummeyer.
Tongs, &c., adjustable. Z S and M C Randleman.
Tools, machine for manufacturing relieved formed revolving. J G Reinecker.
Toy. E Denis.
Trolley wheel. V Cruser.
Truck, car. L Warfield.
Truss. E E Boonhower.
Turning bobbins, spools, &c., machine for automatically. J M Parker.
Valve mechanism for air brakes, quick action. T J Hogan.
Valve, steam actuated. J B Gorrell.
Valve, steam actuated. G L Weller.
Vanillin, making. J Bertram.
Vapor burner. G W Billings.
Vapor burner. E I Nichols.
Vehicle shifting seat. C C Bradley and T Faulder.
Vehicle, child's seat for. T B Padgett.
Violin pad. E Hagenow.
Wagon brake. G M McLaughlin and C E Cooley.
Watchcase spring. E A Remick and P Fleck.
Water closet. J H Stevens, Jr.
Water gage guard. J A and J Hopkinson.
Water sprinkler. H B Everest.
Weigher, automatic grain. L C Guttery.
Weighing device, automatic grain. J Graham.
Welding apparatus. C L Rowland.
Wheel. E Fox.
Wick, lamp. J T Murray.
Wind engine. W H Stewart.
Wire bending machine. F B Griswold.
Wire reeler. G E Dixon.

PATENTS GRANTED MAY 22, '94

Adjustable wrench. J T Trench.
Advertising or signaling apparatus, electric. G L Schneider.
Air brake, automatic. J P Brown.
Air cooling and drying apparatus. W Alsop and W Blackall.
Alarm register, automatic. C C Fields.
Anchor. D Clark.
Animal gun trap. G E Landis.
Animal releasing device. J S Edmonds.
Animal shears. C M Palmer.
Annunciating apparatus, electric. H E Walter.
Armature coils, former for winding. H L Kirket and W Chambers.
Axle box. R Hyde.
Back band hook. W M Hawkins.
Bag fastener. H Engle.
Barrel or cask rack. F A Warner.
Bed, folding. A F Robinson and A B Dodge.
Bed spring. L Wildermuth.
Beer pressure apparatus. R D Schroeder.
Bicycle. S A Grant.
Bicycle mud guard. R Q Rudy.
Blank, freight. C P Clark, Jr.
Boiler cleaner. J N Barnum.
Bolt. A Adams.
Bolt threading machine. C F Wieland.
Book cover. W Thompson.

Bottle. W Band W H Rand.
Bricks, manufacturing porous. H Maurer.
Bridge signal. J E Zimmerman.
Brush, fountain. H Ott.
Buckle 3. A E McClure.
Buckles, clench back for suspender. G E Adams.
Building block. P A Cuenot.
Bung and bushing. G H Merrick.
Bushing and faucet, barrel. G H Merrick.
Bushing, barrel. G H Merrick.
Butter extractor, centrifugal 2. G M Anderson.
Button, separable. J Rodriguez.
Calculating machines, mechanical movement for. L Ehrlich.
Cane transferring device, sugar. A Sanchez.
Car brake. T H Allen.
Car coupling 2. F M Coombs.
Car coupling. S P Nelson.
Car coupling. J A Roosevelt.
Car feeder. B Cron and W von Munchhausen.
Car feeder. W J Rau.
Car fender, railway. J W T Gilliam.
Car fender, safety. F I Clark.
Car safety attachment, street. H A Howe.
Car sand boxes, electric heater for. J M Christopher.
Car starter and brake. R Clegg.
Cars at intersecting points, transferring cable. J Kratz.
Cars, shipping rack and frame for. W R Phillips.
Carbon switch. F von Hefner-Alteneck.
Carding engines, machine for applying card clothing to flats of. R W Hunton.
Cash register and indicator. M Heintz.
Cask rolling machine. L P K Heylgenstaedt.
Castings, manufactured steel. S P Hutchinson.
Catamenial sack. E C Hornor.
Chain, drive. H S Hart.
Channeling machine. H H Arnold.
Chenille, manufacturing. E Cattlow.
Churn. W T Smallwood.
Cigar case. C N Swift.
Cigar lighter. E T Turney.
Cigar moistening device. C M Garfield.
Cigar vending machine. A H Raudall, Jr.
Clevis. W B Hull.
Clock striking mechanism, electric. F L Gregory.
Clutch, friction. A Harvey.
Coal conveyor. H L Carstein.
Coffee pot. J S Dunlap.
Column or pile, metallic. R Gray.
Commutator. C Hoffman.
Convertible chair. C N Wouison and D W Palmer.
Cooker. M Finklestein.
Corn stubble cutter. S L Mason.
Cotton, apparatus for the treatment of. F Zedler.
Cotton openers, &c., evening mechanism for. J C Potter.
Cowl. C W J Marlens.
Crank, variable. C B Davids.
Crimping machine. C Wagner.
Curb and pavement. P W Reardon.
Cut out and cord adjuster, combined. E D Knapp.
Cutter blade clamp. W R Fee.
Cutter head, rotary. G C Goodyear.
Damper, stove pipe. M Redlinger and C Morgan.
Dashboard and fender, vehicle. A F Blease.
Dental appliance. Z Hand.
Desk and seat, school. C T Ammon.
Diamond, glazier's. P Sinz.
Disk, indexed. A J Wills.
Door. R Weidauer.
Door, flexible. H N H Lugin.
Door, flexible. A S Spaulding.
Door spring. J L Wilson.
Doors, &c., truck or carrier for. G E Witt.
Draft equalizer. S I Larkins.
Drainage system. P Scanlon.
Draw bar. M M Suppes.

Dredges, hopper and valve for hopper. A G Lyster.
Drilling machine. A Goddard.
Drilling machines, portable. W J McGehe.
Earthenware vessels, die for the manufacture of. N W Boeh.
Egg preserving case. J H Bowley.
Electric arc lighting system. D Higham.
Electric battery. W W Burnham.
Electric current indicator. J J Wood.
Electric machine or electric motor, dynamo. R K Welch.
Electric machine or motors, brush holder for dynamo. A L Riker.
Electric motors and replacing same, automatic device for removing resistances in starting. G H Whittingham.
Electric motors, pedal governor for. A G McKee.
Electric traction apparatus. P Schoop.
Electric switch. H E Wecline.
Electric apparatus, coin controlled. J O Frost.
Electrical contact mechanism. J F Blake.
Electrical conversion and distribution, system of. T H Hicks.
Electrolytic cell. T Craney.
Elevator. J C Fox.
Elevator gate safety device. A C Beardsworth.
Elevator safety device. L S Graves.
Envelope machine. H D and W D Swift.
Eyeglasses. G W Bennum and J L McKim.
Feed water heater and purifier. C W McDaniel.
Feed water heater and purifier. W Shedlock.
Fence. G H Perkins.
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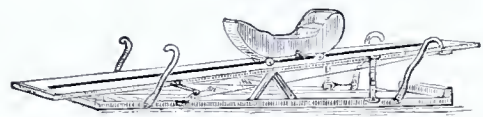
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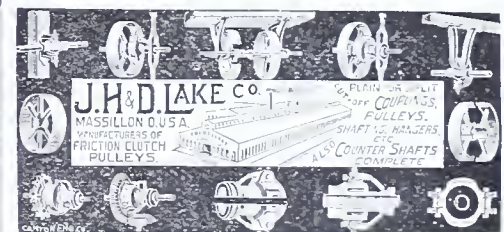
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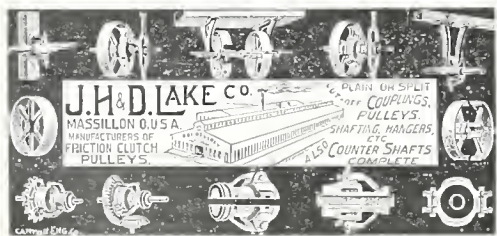
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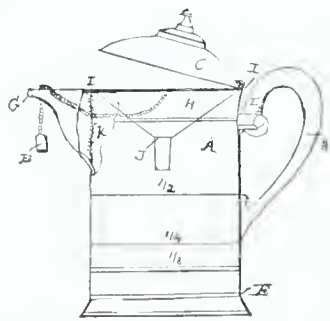
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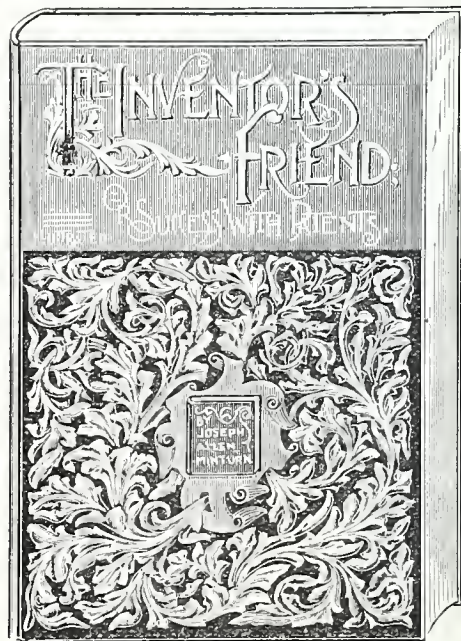
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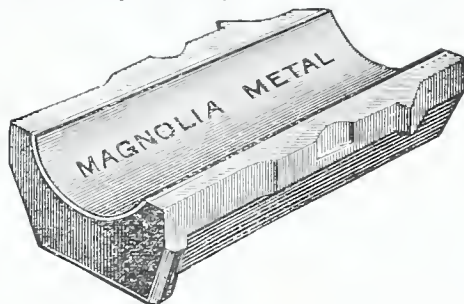
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TORPEDO BOAT "ERICSSON."

The New Miniature War Vessel Recently Launched at Dubuque, Iowa.

Owing to the vast extent of sea coast of the United States, it is generally conceded that it would be almost impracticable to guard our coast line by any system of land defenses within reasonable cost, and as great battle ships and iron clads are formidable only in deep water, where they have unlimited scope for maneuvering, it is evident that the only remaining alternative for practical coast defense is the agile small craft and torpedo boat so constructed that she can wield a telling blow before the warship discovers her, and then run away and be ready to fight again some other day. In conformity with this plan the "Ericsson" or "Torpedo Boat No. 2" was recently built and launched at Dubuque, Ia., and is now on her way to New York to be there turned over to the U. S. Navy, Lieut. Usher assuming command with a crew of twenty-six men and officers.

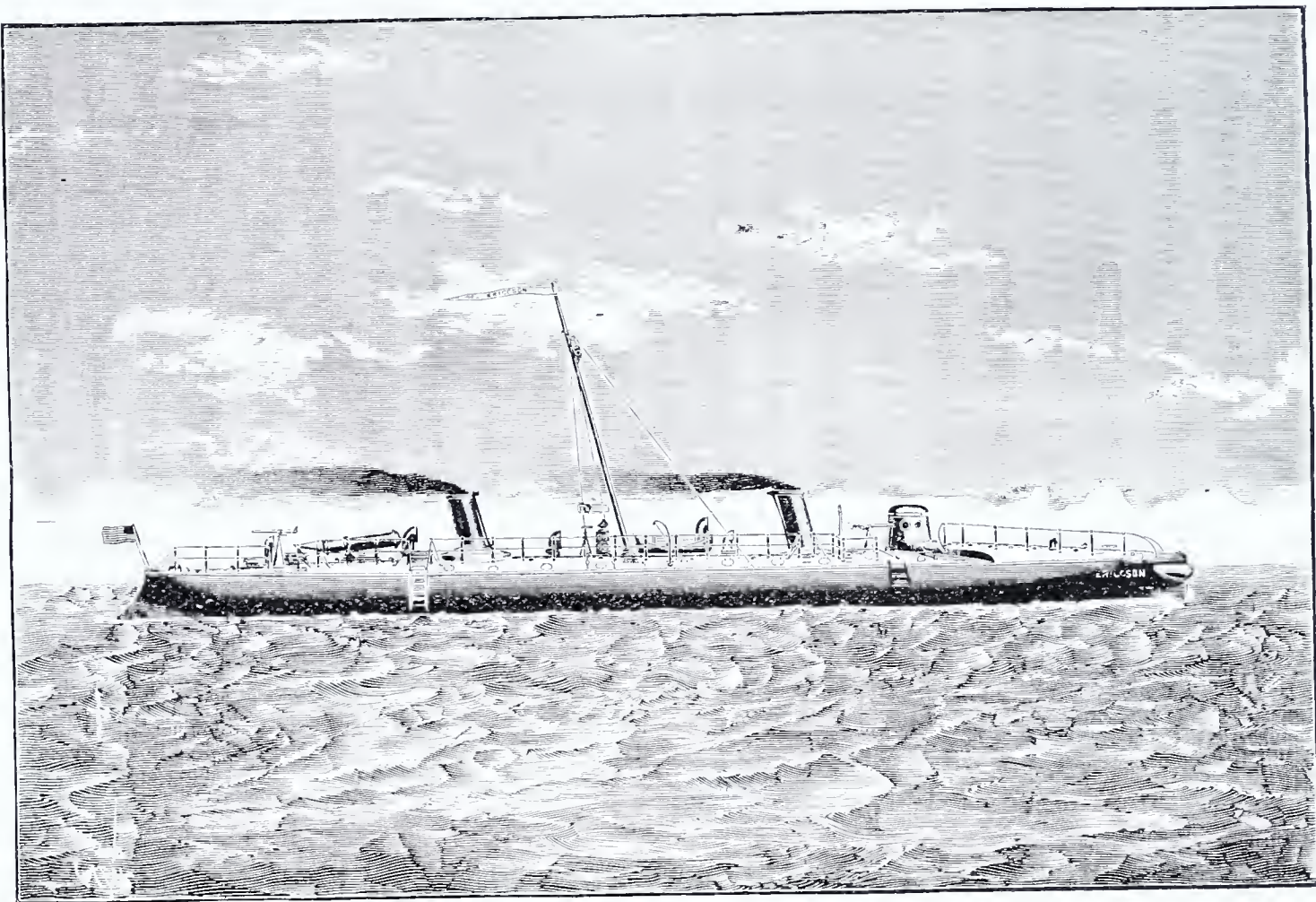
The new boat has a length of 154 feet, a breadth of 15½ feet, and, with a depth of 10 feet 6 inches, has a normal draught amidships of 4¾ feet and a displacement of 150 tons. She has 1,800 maximum horse power. The motive power consists of two sets of four-cylinder quadruple expansion engines of the vertical, inverted, direct acting type, operating twin screws. The cylinder diameters are 11½, 16, 21½ and 30 inches. The stroke of all pistons is 16 inches. The estimate of indicated horse power of the propelling and circulating pump engines, 1,800, is based on the propeller speed of 412 revolutions per minute. One water-tight compartment is sufficient for the two engines. Each of the two boilers is also in a water-tight compartment, the engines standing between them.

These coil or tubulous boilers are of the Thornycroft pattern, and were built under royalty to the English patentees. There are over 1,200 flues in

each boiler, giving the highest possible heating service and admitting of the highest possible steam pressure. These boiler tubes are covered with a casing of magnesia and galvanized steel. These Thornycroft boilers are used in the Ariete and the Rayon, Spanish torpedo boats, which have attained a speed of 26 and 25½ knots an hour respectively. A knot is a mile and an eighth. The required speed of the Ericsson is 24 knots, and the builders are to receive premiums ranging from \$2,500 to \$3,500 for

ning tower. From this tower the vessel is steered and handled, and the power which regulates the discharge of the torpedo originates. The only wood used is the mast in the center and in the interior a three ply veneer one-eighth inch thick. The interior of the Ericsson is divided into twelve water tight compartments, and her armament consists of a fixed torpedo tube, whose mouth, eighteen inches in diameter, is in the bow two feet above the water line. This is fired by compressed air. On the

deck are four long one-pounder rapid firing guns for repelling boarders. There are two turn-table tubes on a diverging or training circle aft on the upper deck, just abaft the after funnel. The diameter of these is fourteen inches. The Whitehead torpedo will be used. The turn-table tubes will be discharged with powder. The Ericsson is intended for night work and is provided with twenty incandescent lights, four hand lamps and a search light that will clearly reveal any object within a mile. The torpedo is fired at a half mile range and travels thirty miles an hour and is capable of destroying any



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each quarter-knot above the guarantee, and corresponding reductions are to be made for deficiencies.

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The steel which has entered into the construction of the vessel has been subjected to chemical analysis not only at the factory but in the ship yard where Lieut. Bankson has also gone over it carefully with a microscope in search of the slightest flaw. The steel in the deck is made especially from government specifications.

On the deck are hatchways, skylights and a con-

known ironclad. The torpedo is from 12 to 19 feet in length and from 12 to 18 inches in diameter. The commander maneuvers the vessel from the conning tower to his satisfaction, then presses the button, as it were, and the compressed air in the torpedo gun does the rest.

The advantage of this class of boats is in their light draft and rapid movement. They can hug the coast and hide away in the numerous bays, inlets and rivers that everywhere indent our coast, and in the dead of night sally forth and strike a telling blow before the enemy is ready for action.

With a system of interior ship canals connecting Massachusetts bay with Long Island sound, and New York bay with Delaware bay, and Delaware and Chesapeake bays with the Potomac, a flotilla of torpedo boats on our Atlantic coast could bid defiance to the combined navies of the world.

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WASHINGTON, D. C., JULY, 1894.

THE New York Board of Health has investigated the question of open street cars and finds that their use in stormy weather is a menace to public health. As a result of the investigation the use of open cars has been prohibited in cold or rainy weather, and the familiar open grip car such as is in use on all cable lines has been condemned and ordered abolished.

THE proposition to increase the first government fee on an application for a patent from \$15 to \$17, is absurd and unnecessary. The policy of the government should be to make the securing of a meritorious patent easier and cheaper. The government treasury is already credited with over \$4,000,000 profit on account of patent fees—a sum much larger than it should be.

THE exit of the overhead trolley system as a motive power for street railways seems to be only a question of time. The successful operation during the past year of the U street conduit trolley in the city of Washington has practically demonstrated that the unsightly poles and wires overhead are no longer necessary for rapid transit purposes; and recently contracts have been signed for equipment by the General Electric Company for three miles of conduit electric railroad for the Metropolitan Traction Co., in the upper part of New York city. If the system proves successful, it will be but a short time till public safety and American aestheticism will demand the lowering of poles and wires everywhere.

IN this issue is presented the able paper, prepared by Mr. Walter S. Logan, of New York on "Needed Modification in Our Patent Laws," and read before the meeting of the American Association of Inventors and Manufacturers. In this paper Mr. Logan combats the idea that simple invention is sufficient to give an inventor an absolute monopoly, and also advocates the policy of recognizing the claims of more than one person to an invention where several inventors, working independently on the same problem reach substantially the same result at about the same time. There is logic in this argument and Mr. Logan's paper will be read with interest by inventors and others interested in the advancement and improvement of the patent system.

ABOUT the 1st of May the cruiser Bennington arrived in San Francisco, after a cruise around the world, covering a period of 83 days and a distance of 13,269 miles. The trip of the Bennington is interesting as showing the possibilities of dispatching naval vessels to various parts of the world in case of emergencies. The fact that had the Nicaragua canal been built and in operation, the Bennington would have reached San Francisco in less than 40 days instead of 83, and would have saved the coal burned in 6,000 miles of ocean travel, is a strong ar-

gument in favor of the speedy completion of that great enterprise. Additional arguments showing why this government should control this inter-oceanic route are numerous and too apparent to need mention. In this connection it is a pleasure to note that during the past month a special committee of the House has been engaged on a bill which will soon be presented providing for the completion of the Nicaragua canal under government supervision. The bill provides that the capital stock of the Maritime Canal Company, of Nicaragua, shall consist of 830,000 shares of the par value of \$100 each, which shall be non-assessable, and no more than this number shall ever be issued except by consent of Congress. It also provides that when the old Maritime Canal Company shall have called in and cancelled all its stock except that issued to Nicaragua and Costa Rica, and all liabilities settled, the Secretary of the Treasury shall, in behalf of the United States, subscribe for 700,000 shares of the capital stock of said company, and the company shall thereupon issue to the Secretary of the Treasury 700,000 shares of the capital stock of the company, to be deposited with the Treasurer of the United States, and in addition thereto, 10,000 shares of non-assessable capital stock of the said company is to be delivered to such persons as may be designated by the stockholders of the Maritime Canal Company, whose stock has been surrendered and canceled. This bonus given to the company, the offices of directors of the old company shall then be declared vacant, except such as represent Nicaragua and Costa Rica. The new board will consist of eleven directors, one each named by Nicaragua and Costa Rica, one by the stockholders of the Maritime Canal Company, and eight by the President of the United States. Not more than four of them named by the President shall be of the same political party. Their compensation shall be \$5,000 a year. Every director appointed by the President of the United States shall make a personal inspection of the canal at least once a year. On the reorganization of this board the Secretary of the Treasury shall have an accounting with the old stockholders and deliver to them capital stock equal to the amount they have already expended in the construction of the canal. This sum shall not exceed \$4,500,000. The United States reserves the right to purchase this stock at par any time except that issued by Nicaragua and Costa Rica. Dividends upon the stock must be made from the net earnings and shall never exceed 5 per cent of the par value of the stock. The construction of the canal is to be under the supervision of United States engineers. The act will be void if the company fails to comply with its requirements within nine months after its passage.

Misrepresenting the Cause of Labor.

No good can come to the cause of labor from such misguided attempts at the amelioration of the woes of mankind as that instituted by an erratic horse trader by the name of Coxey, and a blatant frontiersman named Browne. These self constituted leaders of a quarter of a thousand weak-minded idlers came to Washington for the purpose of furthering certain legislation in the direction of good roads. They came, not to present their petition and appear before the regularly constituted working committees of Congress, but with the avowed purpose of violating the statutes by assembling a mob of people on the Capitol grounds and preaching the fundamental principles of socialism. They defied the authorities, and, as a result, they were arrested, tried by a jury of their peers, convicted and sent to jail for a period of twenty days. In the meantime the poor, misguided privates in the "Commonwealth of Christ Army" as they are pleased to call themselves, go into camp on the outskirts of the city to pose as martyrs and stand as living examples of the tyranny and oppression of plutocracy. Dependent entirely upon charities these poor, simple minded people have been reduced almost to starvation rather than desert their "cause," as they call it, and strike out for work on an independent American citizen basis.

In this connection another phase of the industrial depression, touched upon by The Iron Age in a

leading editorial, is of more than passing interest: "At a time when patient industry is most essential in upbuilding the fabric of confidence, labor troubles intervene to check the work and continue the wearisome reign of disorganization. Just as employers of labor are gradually feeling their way to a resumption of operations and more workmen are again finding their names on pay rolls, the demon of discontent begins his fell work and strikes become prevalent. The knowledge that more workmen are obtaining employment causes those whose wages have been reduced to believe that prosperity has returned and that they are being unjustly treated. Instead of feeling thankful that employment can again be secured, they murmur at the low wages paid and revile the men who are endeavoring to provide them with work. They are consequently ready to follow the advice of labor agitators and abandon their tasks when the word of command is given by their despotic leaders.

Congress is condemned, and justly, for its inaction on momentous public questions, but working men, are almost, if not quite, as much to blame now for a continuance of the business depression as Congress. If every able bodied workingman in the United States should make an effort to obtain employment whereby he could earn some kind of a living, even if the pay for the present should be scanty, endeavoring at the same time to live frugally and forego the luxuries of a happier era, he would be taking the very best course to bring about the restoration of good times and the return of business conditions which would enable employers to pay better wages. The man who refuses to work for \$1 because he formerly earned \$1.25 to \$1.50, or for \$2 because he once found his labor bringing \$3 is unwittingly a stumbling block in his own path as well as that of his neighbor."

No Storage of Electricity.

Popular notions of storage batteries are that they accumulate electricity, store it up and keep it bottled for future use. As a matter of fact, however, remarks a contemporary, there is no actual storage of the subtle fluid in the accumulator. What is done is simply to convert the accumulator into a reservoir of active ingredients which will themselves become a primary battery and generate electricity. The storage battery is simply an ordinary battery put into shape for action by means of electrolysis. In its simplest form the storage battery consists of lead plates. A current of electricity passing between the plates oxidizes the metal on the surface, forming peroxide of lead. The forced current ceasing, a chemical action takes place, reducing the film of lead peroxide back to spongy lead. This chemical action produces the electricity which is popularly supposed to be stored. The "grid" form of plate is now used and the method employed is to mix the oxide of lead with a dilute solution of sulphuric acid until it becomes a thick paste and then to plaster this material, called active material, into the grid. After the plates are filled they are assembled together, alternately positive and negative. They are plunged into an acid bath and are charged with a current. Oxygen is liberated at the positive plate and hydrogen at the negative. The oxygen acts on the red lead and the sulphate of lead, converting them into peroxide; the hydrogen acts on the litharge and sulphate at the negative pole, reducing them to spongy lead. Thus formed, the plates are washed and dried and permanently mounted.

Establishing Electrical Units by Law.

A bill of Mr. Charles W. Stone, of Pennsylvania, which has passed through the House of Representatives, defines and establishes the units of electrical measure. It gives legal recognition to the units of electrical measure adopted by the International Electrical Congress which met in Chicago last autumn. These electrical units are the familiar units of resistance, current and E. M. F., known as the ohm, the ampere and the volt respectively. To these are added the unity of quantity, designated as the Coulomb; the unite of capacity called the Farad; the unit of work, the Joule; the unit of power, the Watt, and the unit of induction, called the Henry.

THE experiment of injecting cement through quicksand to form a solid foundation for sewers, buildings, etc., has proven a success.

NOTES AND NEWS.

Electric Fishing.—A French electrician has invented a fish-catching net with an electric light to attract the fish. When around the net its pneumatic rim slowly inflates and rises to the surface, thereby entrapping without frightening them.

* * *

Preserving Eggs.—Francis M. Underwood, of Pasadena, Cal., is the inventor of a new process for the preservation of eggs. The eggs are placed in a cabinet and subjected to the fumes arising from the combustion of nitrate of strontium, oil of eucalyptus and cassia bark.

* * *

Turpin's Electric War Chariot.—It is said that the French War Department refused to buy from M. Turpin, the inventor of melinite, a new electric chariot or mitrailleuse firing automatically 25,000 bullets a minute, and that M. Turpin thereupon sold his invention to Germany.

* * *

Greased Ships.—Edison is now at work with a plan to grease the sides of ships so that they will slip through the water more readily. He says the friction of salt water and its constituents is much more than is generally believed, and if he can do what he is trying to do, the Campania can make the voyage between New York and Liverpool in four days.

* * *

Fastest War Vessel Afloat.—The speed trial of the new war vessel Minneapolis shows that vessel to be the fastest war ship afloat. Her speed reached a maximum of 23.35 knots an hour, which is a fraction under 27 statute miles. Her average speed during the trial was 22.26 knots. The Minneapolis is the 273d ship launched by the Cramps and the 11th of the new navy. The contract cost is \$2,690,000.

* * *

Vaccination for Cholera.—Experiments made in India under the auspices of the health authorities at Calcutta indicate that cholera may be prevented by vaccination with anti-choleraic virus. In a village of 200 inhabitants 116 were inoculated with this virus. Out of ten cases of cholera in a recent epidemic in the village, resulting in seven deaths, every one of the persons affected was among those who had not been treated.

* * *

A Gigantic Monolith.—What is claimed to be the largest single stone ever quarried is said to have been taken recently from a quarry at Houghton Point, near Ashland, Wis. This monolith, of Lake Superior brown stone, is 115 feet long, and when completed is to be 10 feet square at the base and 4 feet square at the top. The apex will be about 5 feet long and tapered to a 6-inch tip. This obelisk is 10 feet longer than the largest of the Egyptian obelisks.

* * *

Cooking by Electricity.—It has been shown by recent experiments that there is practically no difference in cost between cooking by electricity and by coal, while the advantages of the former method in point of comfort, cleanliness, and safety are considerable. Of every 100 tons of coal burned in an ordinary cooking stove ninety-six tons are, it is said, practically wasted, whereas with electricity the expense is not so much on the fuel as on labour and interest on machinery.

* * *

Long Distance Seeing Machine.—It is said that Prof. Alexander Graham Bell is now engaged in experiments looking to the perfecting of a machine harnessing electricity to light, so to speak, so that it will be possible for one's vision to be extended to any distance desired. Prof. Bell insists that the fact has already been demonstrated and that it only remains to construct the apparatus necessary to bring the possibilities of the discovery into actual and practical use.

* * *

Difference Between the Knot and the Mile.—One of the things which it seems difficult for the public mind to grasp is that there is a decided difference between the knot and the mile. It is certainly about time to have it thoroughly understood that the two are not the same thing. It seems easy enough to remember that a mile is only about 87 per cent. of a knot, the latter being, approximately, 6,082 feet in length, while the statute mile measures 5,280 feet. Three and one-half miles are equal, within a small fraction, to three knots. The result of this difference, of course, is that the speed of a vessel in miles per hour is always considerably larger than when stated in knots, and the confusion of the terms some-

times gives rise to rather remarkable claims of speed performance. When a 20-knot ship, for example, is lightly mentioned, it should be remembered that this really means a little over twenty-three miles: similarly, with higher figures, which are often glibly enough stated, the difference between the terms is worth bearing in mind. It will help to guard against the forming of ridiculous estimates of a vessel's capabilities.

* * *

The Highest Tower in the World.—At Wembley Park, which is about six miles from the heart of London, there is in the course of erection at the present time a tower the total height of which will be 1,150 feet—175 feet higher than Eiffel Tower. Over 150 men are now employed fitting pieces of the tower together. There will be four elevators. Two of them go up to the first platform only, which is at a height of 150 feet from the ground and two will go up to 900 feet, where there is to be an upper landing. Above this there will be several smaller landings, to be reached by stairs only.

* * *

Ramie Silk.—The effort is being made to establish the ramie silk industry in this country. Ramie is a vegetable product, obtained from a sort of nettle native to the Malay archipelago, and is grown extensively in Japan and China. The Japanese spin and weave it by hand into a pongee silk that cannot be told even by an expert from the real silk, the only difference being that it has a trifle less gloss than the worm silk. Another difference is that it does not stretch, and it makes a water-proof fabric stronger than canvas for high grade sails. It is not affected by water, and taken altogether a pure ramie silk, while much cheaper than cocoon silk, is much more durable.

* * *

Fire-Proof Lumber.—A Mr. Nicholas T. Wilson, of Chicago, has invented a chemical solution, by which he claims that wood can be rendered fire-proof. If saturated in this solution, he maintains that it is impossible for a piece of lumber to burn, even if it should be soaked in coal oil. The wood or inflammable material of which houses are constructed is first immersed in the solution of chemicals for a period of twenty-four hours. The lumber is thus claimed to be made fire-proof and will burn no more than a piece of iron or stone. By means of the chemicals, the wood becomes so dense that heat will decompose it by charring only, but will not cause any flame. The substance produces an inert gas, which prevents combustion.

* * *

A Young Inventor's Record.—A genius, thirteen years old, Delmar Zeitler, 2148 Berlin avenue Chicago, has brought out twenty electrical inventions, of which the following is a list: Electric gun and cartridge, ammeter, new motor, electric lantern, speed register, new telephone, electric water gauge, telautograph, arc light, current changer, railroad switch and signal system, differential switch, electric railroad gates, electric scales, self-registering thermometer, electric railroad brake, arc light, lightning arrester, marine engine regulator, dynamo regulator, motor regulator, camera, voltmeter. The young inventor, it is stated, is a great reader, and devotes most of his time in electrical study and investigations.—*Electrical Reporter*.

* * *

Sympathetic Vibrations.—If two tuning forks of the same pitch are placed facing each other, the one sounding, the other silent, in a few seconds the silent one will be giving out a distinctly audible note. Water being an excellent conductor of sound, Capt. Neale has lately invented a system of telegraphing through this medium by the law of sympathetic vibrations. Experiments lately made proved eminently successful. In the signaling, the Morse code was used. He proposes to use his invention in exchanging messages between ships at sea and between ships and lighthouses or harbors. No other connection than that the water supplies is required, and it does not matter whether a vessel is at rest or in motion when receiving or sending a message.

* * *

New Treatment for Consumption.—Mr. G. B. Underwood has invented an apparatus that promises to revolutionize the treatment for tuberculosis or consumption. The principle of his invention is to raise the temperature of common air to a degree where it becomes sterilized and at a high temperature passes through and absorbs certain medicines that are desired to penetrate the lungs for the destruction of bacilli. Thereupon the patient by means of an ingeniously constructed inhaler inhales the medicated air which is enabled to reach every cavity of the lungs, and complete destruction of the disease germ is the result. The inventor is engaged in making certain improvements in his apparatus

preparatory to its general introduction to the medical profession.

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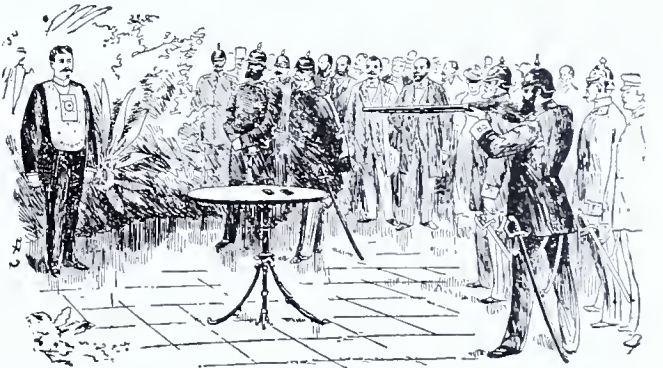
The Haskell Gun.—After nearly two years spent in its construction the Haskell multicharge steel gun has at last been completed at the Scott Works, Reading, Pa. It is to be sent at once to Sandy Hook for trial by the Government experts. The steel of which the gun is composed was made at Bethlehem, and special machinery was made to finish certain portions of the gun. Congress made two appropriations of \$55,000 and \$53,000, respectively, for the manufacture of Colonel Haskell's invention. Including the cost of projectiles, carriage and testing, the total cost of the trial gun is estimated at \$120,000. A special feature of this weapon is two powder pockets along the chamber beside the breech. The gun weighs 35 tons and is 35 feet 2 inches long. The diameter of the bore is 8 inches.

* * *

An Invention for the Deaf.—Prof. Bell argues that hearing is nothing more than the result of vibrations of sound beating upon the drum of the ear, which is communicated to the brain by a series of nerves. Deafness is a defect in this means of communication. A person can hear perfectly through his teeth, as is commonly demonstrated by placing one end of a pocket-knife in the mouth and the other end on a piano, and it is equally easy to communicate sound waves to the brain through any other bony substance—even the skull itself. Therefore, Prof. Bell is constructing an apparatus which, attached to the head, will gather in the sound waves like the transmitter of the telephone, and repeat what they say to the skull, which will convey the information to the brain that lies beneath it.

Dowe's Bullet Proof Coat.

The science of warfare, especially that portion of it which relates to the use of small arms, is threatened to be revolutionized by the introduction of bullet-proof armor for man and beast. The recent tests by foreign army officers of Herr Dowe's invention in this line are reported to have shown remarkable results. The coat or armor invented by this German, has withstood penetration from the deadliest of small fire arms, and the remarkable feature of the tests lies in the fact that the inventor wore the coat himself. At London, recently, a British army officer fired at the armor with a Lee-Mitford rifle, which was capable of piercing the bodies of five men at a distance of one thousand yards, and not only was the armor not pierced but the inventor



himself appeared to be unshaken, remarking that the shock caused him no pain. Firing at the coat hung about plate glass and plaster busts showed the backing to be undisturbed. The coat weighs sixteen pounds and is said to be quite cumbersome, though the inventor claims he can reduce the weight one-half. It appears to be made of felt, about two inches thick. Another inventor has appeared upon the field, however with the statement that he has discovered a material and method by which he can manufacture a bullet-proof armor for man and beast that will be fully as efficient as Dowe's and one that will not weigh half as much and cost about one-third as much.

Inventive genius has been struggling to produce rapid firing small arms of great penetration, and it has been very successful during the past five years, but the introduction of an armor of this character would seem to make the new army rifles useless in time of war. The bullets used in these guns are very small in calibre and flatten into cup shape when fired against this new armor without injury to the wearer. Light, rapid firing cannon which will send a ball with a force beyond human or animal resistance would therefore appear to be the coming destructive instrument in time of warfare.

Names of All Patent Attorneys.

There has recently been compiled by Virginia W. Middleton, the well known stenographer, a list of all attorneys practicing before the United States Patent Office. This little volume is of incalculable value to inventors, attorneys and manufacturers. The cloth binding costs \$1.50 and paper cover \$1. Send to THE INVENTIVE AGE, Washington, D. C. Edition limited.

Needed Modifications of Our Patent Laws.

BY WALTER S. LOGAN.

[Paper read before the American Association of Inventors and Manufacturers, at its annual meeting in Washington, D. C., January 16, 1894.]

Observations made in the course of a somewhat extended and laborious patent practice lead me to the conclusion that certain crucial changes in the Patent Laws of the United States are necessary to give the country and the people, inventors and consumers alike, the fullest possible benefit of our patent system; and I submit the following propositions to this Association for discussion and for its judgment:

1. We should not insist upon absolute novelty in the invention, as a condition of a patent.
2. Where several inventors, working independently on the same problem at the same time, reach substantially the same result, or where all contribute to the result, the reward, that is, the profit of the total invention, should be judicially divided among the inventors, according to their respective merits.
3. Simple invention should not be enough to give a man an absolute monopoly. The inventor should be required in addition to reduce his invention to practice and introduce its benefits to the public, or if he fails to do so, another under proper restrictions should have the right to do it and to share in the profits of the invention.
4. Where the inventor himself fails, either directly or through a license, to supply the full public demand for the patented invention, at prices which are at the same time reasonable to the public and give him a fair and liberal royalty for his invention then the Court should have the power to compel him to grant licenses to others on reasonable terms, and to fix those terms.

In order to discuss these four propositions intelligently, it is necessary for us to consider for a moment the philosophical basis of property in inventions.

We are living in an unreverential age. Institutions can no longer stand on the basis of immemorial existence. Custom, however long continued, is not a sufficient justification for anything. Even the mantle of religion and the teachings of Holy Writ will not suffice. Everything must justify itself by showing that it fits into the conditions of modern life, and is, on the whole, beneficial to the human race, or it must perish.

This test is applied even to such institutions as the christian church and the marriage relation—deemed until recent times, too holy and too sacred for discussion or question.

Among the things most severely and persistently attacked in recent years has been the institution of property. Shall private property of any kind continue or shall the state, or the public in some form, be the only capitalist? Shall individuals or sets of individuals be allowed to maintain monopolies in some of the good things of the earth—in lands, in personal property or in rights and franchises, or shall all be allowed to enjoy everything equally?

The anarchist and the nihilist would pull down to the foundations and begin all anew; the communist would start with a re-division of things; the socialist would hold all things in common; the nationalist would make the state the only property owner; and Mr. Henry George would abolish private ownership in simple land and franchises and open the earth's surface on free and equal terms to all its people.

There is more or less fascination in discussing and speculating upon all these questions; but my charter here, to-night, limits me, and I can consider none of them except as the consideration bears upon the question of patents, or property in inventions.

We have to watch tendencies now as we never did before. The successful business man or lawyer, as well as the legislator, must be something of a seer. Things move so rapidly and change so quickly in this age of railroads, steamships, telegraphs and telephones, of the printing press, the newspaper and the magazine, under the stimulus of free thought and universal discussion, that unless one looks far ahead and steers his bark with the current, he will find himself stranded and left behind.

In what direction is property in inventions drifting? Is the inventor to be better or worse protected as years roll by? Is it safe for a man to make it his life's work to discover some new or better way of doing something, and what reward can he reap for his labor? Shall he provide cheap food for the world and then die of hunger himself? Shall he invent some new way of ministering to the gen-

eral happiness and then live a life of individual poverty and wretchedness; or will the new civilization provide rewards adequate to the service and pay for what it gets?

There is no question which can be discussed, here, or anywhere, of more transcendent importance.

There has been a great deal of speculation upon the philosophical basis of property in general. Why is one man allowed to put a fence around acres of the earth's surface, the common heritage of humanity, and keep all other men off? Why can any one monopolize a rich jewel, dug out of the common earth, or a beautiful panel carved from a tree out of nature's forests? Why can he appropriate to himself the fruit and increase of flocks and herds which roam over the common sward and feed upon the herbage which comes from God's laboratory? Or why can the few men who compose the New York Central Railroad Company have the exclusive privilege of running a railroad through the Mohawk Valley?

Some incipient philosopher in the time of the New Testament was asking such a question as this of One at whose feet the world has since learned to worship, and the reply came back, "Render unto Caesar the things that are Caesar's." The answer was one worthy of its divine origin, and so far as it goes no fault can possibly be found with it as an ethical maxim; but considered as an absolute rule of conduct, the difficulty with it is that we don't know what is properly Caesar's and what isn't, and



WALTER S. LOGAN.

no attempt is made to enlighten us upon this subject. Is it Caesar's or some one else's because it bears a certain image or superscription? Does it exist for the private benefit of some particular individual, because he happens to have been able to enclose it in his brawny hand and defend it with his strong arm? Is it his, simply because he has taken it from the bowels of the earth or re-fashioned some work of nature? Is it his because a man-constituted court has sat in judgment on the question and the sheriff or marshal has delivered it into his custody? Is it his because he has some privilege or immunity, general or special, which is denied to the rest of humanity? Is it his simply because he claims it and nobody else objects? What rule shall we adopt, what test shall we apply, to determine the question of ethical ownership to anything of which property is predicated?

Philosophers, metaphysicians and economists may discuss the question to any extent they will, and settle it to their own satisfaction as they may; but as for us, plain, practical men, who have to take the world as we find it, and are not even fully satisfied that we could have made a better one if we had had the contract, there is only one adequate basis for the right of property—the general good of all humanity. Private ownership of lands and goods has been acquiesced in, and our civilization has been built up around it, simply because the world has discovered by experience that it is better for all concerned, for the man who has not, as well as for the man who has, that it should be so; because it has been found that each man gets more of the good things that the earth has to give him, with an exclusive and personal title to a little, rather than with

an undivided, general interest in much. The basis of our titles is not in religion, in force, in sentiment or in wrong; it is in the fact that long centuries of experience have shown that the institution of private property is for the general welfare. The man who has profits by his own, and the man who has not profits by the possessions of his neighbors. It is, for the ordinary citizen, easier to buy a dinner, ready cooked, than to cook it, and besides, he probably gets a better dinner. The man just entering life is better off, if he have a chance to earn a living by working for others, than if he simply had an undivided interest in uncultivated acres and full liberty to work and labor thereon to his utmost on his own account. The real test to which all human institutions must at last submit is: Would the world in the aggregate be better off, with, or without, them? Private property will continue so long as it is useful to humanity, and if the time ever comes when it ceases to be useful, the institution of private property will cease.

How is property useful? What good does it perform? What sphere in the world's economy does it occupy? As we answer these questions we shall be able to judge what kinds of property are likely to continue longest, to be held in the highest esteem and to produce the greatest profit to the owner.

I see nothing in property but a universal, highly evolved, automatic and generally just, system of rewards. Ownership of property enables its possessor to enjoy more of the blessings the world has to bestow and to get more out of life than he could without it. So everybody wants property. The world needs the work of its inhabitants. To get property, the citizen must be industrious, and so the world benefits by his industry. The world needs the results of accumulation and acquisition. To accumulate and acquire, one has to be frugal and saving, and so the world profits by the individual's frugality. The world needs great works of improvement, railroads, steamships, factories, machinery, buildings, permanent structures and works of a hundred kinds. The ownership of these is profitable and produces a revenue. Therefore people invest the proceeds of their labor and their accumulations in these works, and the world profits thereby.

But what does the world need most? What is it that has, within the last century, revolutionized the face of the earth and changed the whole manner of men's lives? What is it that makes the world a so much better place to live in now than it was a century ago? Mainly the work of its inventors and discoverers—of such men as Gutenberg, Arkwright, Watt, Stephenson, Fulton, McCormick, Pullman, Morse, Bell, Edison and hundreds and thousands of others whose united work has made it possible to cross the continent now easier than you could go one hundred miles in olden times; enables us to step into a palace, and after a few days of luxurious living, arrive on the other side of the earth; has made food so cheap that none need go hungry and clothing so easy to obtain that shop-girls are dressed in finer raiment than queens used to wear; gives us the brilliancy of noonday through the long winter evenings, at an insignificant cost, the morning newspapers for two cents, and books so cheap that libraries are getting out of date; and enables us to enjoy life in all its phases to an extent that our grandfathers never could have dreamed of.

And so, we pay rewards to our inventors. We didn't appreciate at first what they were doing for us, and we got their work too cheap—so cheap that many a man who has done more for humanity with his brain than all the Rothschilds ever did with their money has died in poverty, and even his memory has had to wait for a more appreciative generation to do it justice. But these things right themselves, and mistakes and wrongs rarely survive the generations which commit them. We are honoring our inventors now in a more substantial way; we are beginning to allow them to get rich. I expect to live to see the time when Thomas A. Edison will be wealthier than any of the Vanderbilts, and he ought to be.

The world will need the services of the inventor quite as much in the future as it ever has in the past. We have only captured the outpost of knowledge, picked up a few grains here and there on the border. The whole vast country beyond is unexplored and waits for the great benefactors of humanity to recover it. In electrical science, for instance, we have only scratched the surface. The depths that have yet to be revealed, no man has ever sounded. We have only learned the primer of the art of transportation. We still cling clumsily to the earth and dare not yet tread the free and waiting air. We dig deep in the ground for dirty coal, while the clean sunlight goes to waste all around us; and we still laboriously use the plow and the hoe to raise food, while we are waiting for the great chemist to come who will produce it direct from earth and air, without the intervention of vegetable or animal life. The planet we live on is good enough and there is enough of it to support ten times the population it now has, in comparative ease, luxury and leisure, instead of laborious and grinding toil, if we only knew how to do it. It is the inventors and discoverers who are to lead the way. For the great services

which they have to render in the future, the world must pay them great rewards. It needs what they are doing now much more than it needs the result of patient, plodding industry, the savings of the prudent or the investments of the wise, and as it needs it more, it must and will pay better for it.

As property in inventions is the way the world has of paying a reward to the inventor, and as the world needs the work of inventors more than it needs the work of any other class of its citizens, we may fairly conclude that property in inventions will last longer and be more desirable than any other kind of property. The talk of repealing our patent laws is the veriest nonsense. They are not to be repealed; at least while other kinds of property than patents continue. Sooner will the world abolish property in land, property in flocks, property in goods, property in everything else. If there is to be a survival of the fittest, it must be the fittest that survives, and property in inventions must last longest and be most honored, because it is most needed and produces the best results. We have outgrown the old idea that patents are monopolies, a survival of a little that is good from the mass of the selfish, unrighteous monopolies of the time of Queen Elizabeth. Whatever the theory originally was, and however the right first grew into the system of the Common Law, a patent is now nothing but a species of property, as well recognized and understood as property in lands or chattels. There is no more monopoly about it than there is about the ownership of a house or a horse. It is a monopoly in the same sense that all property is a monopoly, and in no other sense. If we go back to first principles and discuss the question of ethics, we shall find quite as much reason for giving a man property in the labor of his brain as in the labor of his hands, quite as much to justify ownership in thoughts as in things. But it is not necessary to discuss the question of abstract right and justice. We have no need to appeal to religion or morality. We really give the inventor a property in his invention, not so much because he has earned it, not so much because it is his due and right, as because we, the rest of the world, advantage by his enjoyment of his own profits, and because we want every man, by seeing his prosperity, to be stimulated to do as he has done, and by the expectation of similar results in his own case, to himself be moved to invent or discover something that the world needs.

Our patent laws should be formulated in view of this fact. They should be so drawn as to give the greatest stimulus to inventors, and at the same time let the world in general get the greatest benefit at the least cost. It isn't necessary that we should pay too lavishly in order to give most munificent rewards to the men who render the greatest service in the way of invention. All that is needed is to see that what the world does pay the inventor gets.

The problem before us is to so pay a little that the inventor may get much. What we have been doing is to pay much, so that the inventor might get a little. Industries have been paralyzed by patents while patentees have remained poor.

The objects of the modification of our patent system which I propose is to enable the world to get more benefit from the invention, while the inventor gets more profit from the patent; to make property in patents more valuable to the patentee and at the same time less onerous to the public; to punish ourselves less and profit him more.

Our patent laws now require that the invention shall be absolutely new, and this requirement is most strictly and (as many of us practicing patent lawyers sometimes think), oppressively enforced by the courts. The inventor may devote the best part of a lifetime to the perfection of some improvement he sees to be necessary in a vital machine or process employed in some important industry. He succeeds in his efforts. He produces a better result at half the previous cost. He introduces his improvement into every factory in the land. The whole nation profits by being able to get some important product of human industry or vital necessity of life at a much lower price; and then the inventor is defeated, either in the Patent Office in his application for a patent—or, more likely, in the courts in trying to enforce it—by something that was never reduced to practice, was never brought to the attention of the world, and never did anyone any good, but which appeared in some obscure publication, published in a foreign language, perhaps little understood and less read, at a period so remote that the present generation knew nothing of it; or perhaps it is by some insignificant experiment, made by one utterly ignorant of its importance, in some distant region, never made known and entirely forgotten; but the enterprising lawyer for the defendant spends his client's money with a lavishness which, if the real, meritorious inventor was the object, would enable him to live on a bed of roses the rest of his life, and succeeds in getting on the track of it, and wrests the old evidence from the oblivion to which it rightly belonged; and the life of a man, who has devoted the highest of talent to the noblest of purposes, is a wreck and a ruin; and on the other side, the chance is that not even the infringing defendant gets any good of all this, for when he has paid the cost of the litigation, he most likely finds that it

exceeds the net proceeds of his piracy, and that he had much better paid a fair license to the patentee and been, himself, protected by the patent.

Any lawyer, who is familiar with the decisions of the Supreme Court of the United States for the past twenty years, knows that I am not overdrawing the picture or stating an exceptional case.

The result is that mothers are wont to warn their children against the development of the inventive genius, as in olden times they did against the black man in the closet; bankers refuse to loan money to an inventor, and patentees and paupers are apt to be classed in the same category.

And this is the way the world, which needs more than it needs anything else the services of the inventors, encourages invention.

There is no logic in the requirement of technical novelty. The man who actually invents a thing the world needs, and teaches the world to use it when it did not use it before, is an inventor who is entitled to the world's gratitude and its best rewards, and should not be defeated because some one else may have previously stumbled on the same thing without knowing its value or putting the world actually in possession of it.

An invention should be new enough for a patent, if the inventor, actually and independently inventing it, brings it for the first time to the world's actual knowledge.

I submit that section 4886 of the Revised Statutes should be amended so as to read like this:

"Any person who has invented or discovered any useful art, machine, manufacture, or composition of matter, or any useful improvement thereof, not theretofore generally known or used, may, upon payment of the fees required by law and other proceedings had, obtain a patent therefor."

with appropriate amendments in the language of the other sections to conform.

The section, as it now stands, is substantially as it stood in the statute of 1836, and is therefore something over half a century old. During that half century the number of patents in the United States has increased from a few paltry thousands to more than half a million, and in other countries in a like ratio. There were few scientific publications then, where there are multitudes now. The chance of finding an anticipation of a valuable invention then was very small compared to the strong probability of finding it now. It was not much of a hardship to require absolute novelty in the invention then, but to require it now makes the inventor not only a gambler with fortune, but a gambler playing against loaded dice. The section as drawn in 1836 may have been the embodiment of wisdom, but now, in our totally changed conditions, it seems the embodiment of folly.

My second proposed modification relates to dividing the profits of the invention, where bona fide, independent inventors, independently reach the same useful result, in ignorance of one another.

In my own practice, I happen to have had a little personal experience which seems to me to emphasize the importance of this proposed reform.

Three honest, bona fide, meritorious inventors, each in absolute ignorance of the work and even of the existence of the others, undertook to make an improvement, of such a nature that it was revolutionary in its effect, in a very important industry. They all devoted long years of labor, study and experiment to the matter. They all passed a good share of a lifetime in poverty, devoting their time, their talents and their money to the work. They all reached substantially the same result in substantially the same way. They all arrived at the point of invention within, at the most, two months of time. Within a year after that, the invention was in use in every civilized country and was an assured success and of almost incalculable value to the world. There was no question as to the honesty or merit of all the three inventors or the absolute independence of their work, and of their ignorance of each other, previous to their invention.

It cost a tolerably good sized fortune to litigate the question as to which of the three, within that little space of two months, actually reached the stage of invention first. My client won. He won only by a neck—but he won. After paying all the expenses of the litigation, including a fee to myself of which I have no cause whatever to complain, he realized a fortune from his invention within a few years. The cost of the litigation to the other inventors left them and their backers financial wrecks, and the nervous strain during the ordeal, and despondency over the result, completely broke them up so that they died, poor and broken hearted.

The fate of these men is not such as to encourage others to seek to benefit the world by the exercise of inventive genius.

Under the law as it exists to-day, every man who is trying by invention to solve a problem, whose solution will benefit humanity no matter how much, is only tempting Providence, and although entirely successful, he may lose all his rewards because he comes only a day too late.

Let us change our laws so as to make the inventor's life, if we can, a little less of a lottery and his reward, if successful, a little more sure, and we will have more and better inventors.

These changes I have been so far advocating are

apparently for the benefit of the patentee. It is true, nevertheless, that whatever benefits the inventor stimulates invention, and so, benefits the public, and I think it cannot be fairly said that the reforms, in any sense or in any way, benefit the patentee at the expense of the public. The public can hardly be said to have generally gained when the courts have decided, as they so often have, that some otherwise valid and valuable patent was void, because while the patentee was a bona fide and meritorious inventor, he had been anticipated by some obscure and unappreciated experiment, made and forgotten long years before. Some infringer may have got off with a whole skin, when otherwise he would have had to pay heavy damages, but it can hardly be said that his fate, so far as his own fortune was concerned, was a matter of public concern. The public are not interested in seeing one man profit by pirating the genius of another.

If inventors were required to divide the rewards of something which they all independently invented, individuals might have to be content with lesser fortunes, but the public would be quite as well served.

The last two of the amendments I propose are decidedly and positively in the interests of the public, and of the public alone.

It is in the interest of the public that an inventor should be required to reduce his invention to actual practice, and bring it into public use, or give up some portion of his reward to the practical man who does this, and it is likewise in the general interests that the inventor should be required to manufacture the patented article and to supply them to the public, so that the public demand is fully met, at fair rates—that is, at rates which give him a liberal reward as an inventor in addition to a fair profit as a manufacturer—or that he should give licenses on fair terms to others who will.

The inventor should not be allowed to pursue, as he is sometimes inclined under the present law, a dog-in-the-manger policy. He must either do something himself or allow others to do it. He gets a valuable grant from the public and a reward for a supposed public service. He must render his service or give up the reward. The public, if they give him his patent may fairly see to it that they get the fruits of the invention.

There will be found, I think, no practical difficulty in fixing the amount of a proper license fee or percentage for a fair division of profits. Such questions would not ordinarily be as difficult as the questions which come before the courts every day in patent cases under the present law, and the courts can easily devise some convenient and expeditious way of reaching a fair determination.

Such, gentlemen of this association, are my reasons for advocating the proposed changes in our patent legislation. With the reforms adopted, the aggregate burden of the patent laws upon the industrial public and the general community would, I think, be lessened rather than increased, while it seems very clear that property in patents would be subjected to much less hazard, and therefore would be much more desirable and valuable; the security of the inventor would be much increased and invention in every way stimulated.

While the public would give less, the inventor would get more.

Deer Park on the Crest of the Alleghenies.

To those contemplating a trip to the mountains in search of health and pleasure, Deer Park on the crest of the Allegheny Mountains, 3,000 feet above the sea level, offers such varied attractions as a delightful atmosphere during both day and night, pure water, smooth, winding roads through the mountains and valleys, and the most picturesque scenery in the Allegheny range. The hotel is equipped with all adjuncts conducive to the entertainment, pleasure and comfort of its guests.

The surrounding grounds, as well as the hotel, are lighted with electricity. Six miles distant on the same mountain summit is Oakland, the twin resort of Deer Park, and equally as well equipped for the entertainment and accommodation of its patrons. Both hotels are upon the main line of the Baltimore and Ohio Railroad, have the advantages of its splendid Vestibled Limited Express trains between the East and West. Season excursion tickets, good for return passage until October 31st, will be placed on sale at greatly reduced rates at all principal ticket offices throughout the country. One way tickets reading from St. Louis, Louisville, Cincinnati, Columbus, Chicago, and any point on the B. & O. system to Washington, Baltimore, Philadelphia, or New York, or vice versa, are good to stop off at either Deer Park, Mountain Lake Park or Oakland, and the time limit will be extended by agents at either resort upon application, to cover the period of the holders visit.

The season at these popular resorts commences June 23rd.

For full information as to hotel rates, rooms, etc., address George D. DeShields, Manager, Deer Park, or Oakland, Garrett County, Maryland.

WORLD'S FAIR AWARDS.

What the Diplomas will Contain and the Law Governing the Use of Fac-Similes.

The Bureau of Awards of the World's Columbian Commission, which has been located in this city since the first of last December, is rapidly nearing the completion of its labors, some idea of the extent of which can be gained from the statement that 65,000 exhibitors entered more than 300,000 articles for examination for award by the thirteen different international departmental committees of judges. Approximately 20,000 of these exhibitors received awards of medals, which will be accompanied by several thousand more diplomas. Under the rule an exhibitor is entitled to receive one medal in each group in which he was granted an award and one diploma in each class. In other words, an exhibitor who was granted an award in group 69, (which was designated as the group for the generation and transmission of power), on engines will receive but one diploma and one medal, even though he may have had a number of engines on exhibition and several of them recommended for award; but if he should have received an award on engines and boilers as well, he will receive two diplomas and one medal, as his entire exhibit was made in one group but in two classes; and this system will prevail throughout the entire distribution of awards. Thus the successful exhibitor who was fortunate enough to have exhibits in several groups and a number of classes will receive medals and diplomas accordingly.

The duties of the Bureau of Awards have been of considerable magnitude, the details of collating the groupings and classifications, correcting the names and addresses of exhibitors, copying, in duplicate form, the language of the individual judges, certifying to foreign and domestic executive commissioners lists of successful exhibitors from their respective countries and states, checking these back with the original records, recording the duplicate copies of the findings of the judges and forwarding a copy of same to the exhibitor, has required the close attention of a corps of efficient people, who, up to date, have sent forth more than 16,000 of these official copies of awards and attended to all the correspondence and detail work in connection therewith.

The copies of awards as now going forth to exhibitors will constitute the language used on the regular diploma, and will form the points of excellence or merit as determined by each judge and confirmed by the committee of judges of which he was a member. The diploma will, therefore, constitute the valuable part of each award, as the medals will all be of bronze and alike except as to the engraved name of the person or firm upon whom bestowed. The medals and diplomas are being prepared under direction of the Secretary of the Treasury, and their distribution will no doubt begin as fast as they come from the Philadelphia Mint and the Bureau of Printing and Engraving, respectively. A modified form of the reverse side of the medal has been prepared by Augustus St. Gaudens, the original designer, and but for the shock caused to the senses of certain officials in the first design, this feature of the work might have been completed before this date. Yet it is thought, from the best information obtainable upon the subject, that the medals will be ready some time in September. One side will be from the original St. Gaudens' design, and the reverse from a form submitted by an attache of the Philadelphia mint.

One artist has now been working nearly a full year upon the diploma plate and will probably complete the engraving within the twelve months, after which the duplicate plates will be made and World's Fair exhibitors begin to be supplied with one of the finest, if not the most elaborate specimen of plate printing ever produced.

The act of Congress which authorized the Secretary of the Treasury to prepare these symbols of recognized merit also carried with it an almost literal copy of the counterfeit law, and as a consequence exhibitors and others who have been using designs in similitude of either the medal or diploma for commercial purposes have found themselves harassed by officers of the secret service division of the Treasury Department. All these designs and the printed matter containing them have been seized by these officers, and successful exhibitors thrown into consternation by being brought face to face with a law which prescribes a heavy fine and imprisonment.

A large number of exhibitors, however, have been publishing the language used by the judges as certified to them by the Bureau of Awards, and it has been generally presumed there was no law to prevent this, although the act covering the duplication of the design of the medal or diploma also specifies the inscription thereon, as will be noted, the section

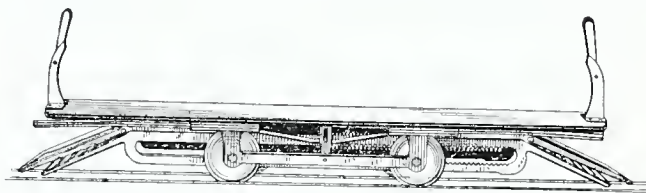
of the law referring to this subject reading as follows:

And every person who, within the United States or any territory thereof, without lawful authority, makes or willingly aids or assists in making, or causes or procures to be made, any die, hub, plate or mold, either in steel or in plaster, or in any other substance whatsoever, in the likeness or similitude as to the design, or inscription thereon, of any die, hub, plate, or mold, designed for the striking of the medals or diplomas of awards for the Columbian Exposition, as provided in section 3 of the act approved August 5, 1892, or conceals or shall have in his possession any such die, hub, plate, or mold, hereinbefore mentioned, with the intent to fraudulently or unlawfully use the same for counterfeiting the medals and diplomas hereinbefore mentioned, or who shall fraudulently or unlawfully have in his possession or cause to be circulated any duplicate or counterfeit medal or diploma, not authorized by the Secretary of the Treasury, shall, upon conviction thereof, be punished by a fine of not more than \$5,000 and be imprisoned at hard labor not more than ten years or both, at the discretion of the court."

Exhibitors who have been anticipating the use of fac-similes of the medal and diploma for commercial and other purposes will therefore know how to govern themselves.

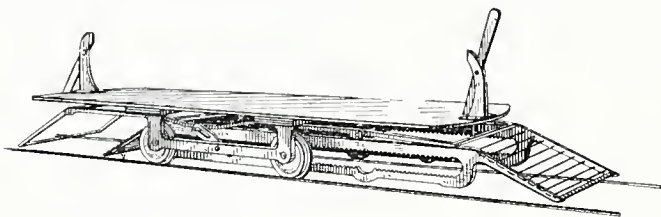
Brock's Automatic Car Fender.

If it is true as asserted by Mr. Stead that Chicago kills an average of one person a day for every day in the year, on her grade crossings, it would seem that the man who can produce a practical life saving device in the shape of a car fender not only has a fortune in sight, but is entitled to be considered somewhat in the light of a philanthropist. In this category comes Mr. W. H. Brock of Nos. 7 to 12 Seabring St., South Brooklyn, N. Y. He has recently given the world a device known as Brock's Automatic Fender for cable and electric cars. The fender itself has a frame of light steel or wood, across which is stretched a basket netting of rawhide or rope. It is attached to the running gear of the car instead of to the body, and thereby all the usual joggling or hopping up and down movement peculiar to other fenders is obviated. The fender when in position at either end of the car, attached to side bars and directly underneath each platform, are



just the length of the car. It is made so as to run out longitudinally with the car not more than two inches above the ground and nothing can get under the wheels. It works automatically, and the gripman need never touch his lever. A light steel frame, which the inventor calls the operating rod, projects beyond the front of the car, and when this strikes an object with a resisting force of five pounds or even less the fender runs out and the rod slips back and up over it, out of the way.

The fender is also arranged so that it may be worked by the gripman or motor man. In case an object is seen on the track, the fender may be instantly projected by a simple touch of a lever. Two sidebars of hickory or some other hard wood run underneath the car. These are three-quarters of an inch thick and three inches deep. On this framework are a top and bottom rack one-quarter of an inch thick. A pinion runs along this rack when the mechanism has been set in motion. When the pinion drops in a pocket, the fender is in place in front of



the car, projecting about six feet. When the fender is underneath the platform, it is so close to the ground that by no possibility could any one be dragged under the wheels.

The entire weight of the invention including its accompanying mechanism is less than 100 pounds, and cars can be equipped with it complete at \$30 per car.

Experts who have examined Mr. Brock's invention pronounce it far ahead of anything in its line. It is certainly a device that has a large field of usefulness. Mr. J. W. Alexander of 247 West Fifty-fifth Street, N. Y., is associated with Mr. Brock and is interested with him in bringing the invention to the attention of the public.

The New Danish Patent Law.

Danish patents, hitherto granted by royal decree under a set of administrative regulations, are hereafter to be granted under a law, of which some of the more important provisions are as follows:

Patents will be granted for all inventions deemed of sufficient importance, not prejudicial to public order or morals and not relating to articles of food, drink or medicine, or the processes of making such articles. Their term is fifteen (15) years from the date of the delivery, without renewal or extension. The patent is to be granted only to the inventor or his authorized representative.

The patentee is to pay an annual tax amounting to 25 crowns for each year of the first three, for each of the second three 50 crowns, each of the third 100, each of the fourth 200, and each of the fifth 300. (A Danish Crown is about twenty-six 8-10 cents).

Applications are to be made in the Danish language to a Patent Commission of five members sitting at Copenhagen, one of whom must be learned in the law, the others in matters pertaining to the arts. In case of necessity the assistance of other experts may be called in. The application must contain a petition and a specification, both in duplicate, a drawing (also in duplicate) when necessary to the description, and a model or specimen when required; and must be accompanied by a fee of twenty crowns (about \$5.40).

A foreigner must file with his application a declaration designating an attorney domiciled in Denmark who shall represent him in all matters concerning the patent.

The Commission after satisfying themselves that the application complies with all the requirements of the law, that the invention is of such a character as may be patented, and the applicant is the inventor or his lawful representative, shall cause the application to be published, after which a period of eight weeks is allowed for opposition. During this period the Commission may seek from any source advice or information bearing on the propriety of the grant. They shall make their decision within sixteen weeks from the date of publication. From a refusal there may be a demand for reconsideration, and provision is made for appeal to a special Commission. After allowance there is a final fee of 10 crowns.

The patent may become void through non-payment of the annual dues, and through failure to exploit the invention within the realm for three years from the grant, or if afterwards its working shall be interrupted for more than one year.

Persons having patents under the old system may exchange them for new ones at any time before July 1, 1897.

This law was approved by the King on the 13th of April and was to go into effect two months from its publication.

It will be observed that the whole cost of a patent if maintained in force for its full term, exceeds \$550.

F. A. SEELY.

A New Electric Switch.

Messrs. C. F. Speed, E. W. Barker and C. P. Frank of Duluth Minnesota have received, through their attorneys, Messrs. Mason, Fenwick & Lawrence of Washington, D. C., a patent, No. 517,773, for a new electric switch which is looked upon very favorably by the trade and promises to bring good returns. Most electric switches heretofore constructed are what are known as "two point" switches, but the present invention relates to what are called "three point" switches, and the objects are to provide a switch capable of regulating two independent circuits and being so arranged that either one circuit or the other can be broken, or if desired, both can be broken or both maintained, and in breaking one circuit and starting the other, there will be no interval in which neither circuit will be in operation, and thus the lights or other devices controlled by the one circuit, will not cease to operate until those of the other circuit are started; and second, to feed two circuit wires connected to the switch from a single feed pole thereon, either both at the same time or either one separately. The invention will be found particularly useful in private dwellings where it is desired to operate the lights of a chandelier from a suitable place on the wall, as by its use any one or more or all of the lights of a chandelier can be put on or off without an intermediate period of darkness between the shifting of the current from one circuit to another.

"Tips to Inventors."

This is one of the most instructive and useful works for mechanics and inventors. Its author is Robert Grimshaw, M. E., and the book, cloth bound, retails for \$1. THE INVENTIVE AGE for one year and "Tips to Inventors" will be sent to any address for \$1.50.

ABOUT PATENT SHARKS.

Institutions that will Bear Looking into by Inventors and Others.

In our June issue we took occasion to give warning to inventors against the army of human vampires who do business under the various aliases of Patent Brokers, Patent Agencies, Patent Exchanges, Patent Investment Companies and the like, and whose initial methods consist of deluging patentees, whose names are published each week in the U. S. Official Gazette, with a flood of seductive and highly colored literature singing the superlative praises of the aforesaid vampires and offering special inducements for the negotiation of "sales" of patents upon payment by the patentee of a small fee for preliminary advertising, preparation of papers, etc. Among others we referred to the so-called "American Patent Exchange, publishers of The Inventive Age," with "headquarters at Chaffee, N. Y., George B. Smith, manager," and at the same time we lodged a formal complaint with the Postmaster General and requested that a U. S. inspector be detailed to investigate the methods of Mr. Smith.

Under date of June 6, 1894 we received a letter from the "American Patent Exchange, Geo. B. Smith, manager" disclaiming all intent to injure any one by attempting to appropriate our name and good will, and continuing the letter further says:

We did not know that there was such a paper published as your INVENTIVE AGE, until about a week or ten days ago, and we learned of it through our correspondence. Since learning this we have made arrangements to change the name of our publication. *** We have not yet sent out any paper bearing the name of yours and shall not. *** We had given our order *** for 2,000 copies for the June edition, when we learned of the existence of your publication, and we made arrangements to change the name of our publication before the said 2,000 copies should be printed.

On May 25, 1894 Mr. Smith addressed a letter to Mr. William H. Ford, a patentee of Shelton, Conn., offering glowing inducements to sell the latter's invention. The letter was written on stationery of the American Patent Exchange with "head sales-house, Buffalo, N. Y. Branches, New York, Chicago, New Orleans, San Francisco," and conveyed to Mr. Ford the following priceless intelligence:

Here we publish a beautiful illustrated paper called the Inventive Age. We have a list of the most prominent minded men throughout the country. To all such we send the Age free. It is a sheet that commands attention and is the medium through which capitalists and manufacturers know of the best inventions of the day, sending out as we do each month a vast edition of the Age to the very class who *** now stand ready to buy good inventions.

Mr. Smith's astounding literary production further asserts that "no honest broker can say exactly" what the patent is worth, but that such patents usually bring from \$3,000 to \$50,000, depending doubtless upon the gullibility of the seller or buyer; and then to cap the climax and as the *ne plus ultra* of reasons why the American Patent Exchange is the greatest institution within the confines of the solar system, it is confidently asserted that "the powers of Niagara are harnessed," and "Buffalo with its superb location and 5,000 manufacturers is rapidly attracting the combined capital of Europe and America." But Mr. Smith true to the inherent characteristics of his illustrious ancestor of Pocahontas fame, who outwitted the wily red skins with a pocket compass, and doubtless desirous of not being confounded with ordinary every day Snyths or Schmidts says,—"Please do not confound us with the many cheap John patent agencies, which have become so numerous."

It is probably not necessary to comment on the ludicrous side of Mr. Smith's enterprise and his "vast edition" of 2,000 copies which failed to materialize; but there remains a serious phase to his venture which requires more than passing notice. It seems that the letter to Mr. Ford did not induce that gentlemen to put \$20 into Mr. Smith's capacious coffers. So we find that on June 2, 1894 some days after Mr. Smith had actual knowledge of the existence of THE INVENTIVE AGE, according to his admission in his letter to us, he again wrote to Mr. Ford urging additional considerations upon him, and claiming to be the manager of the American Patent Exchange and publisher of the "Inventive Age." If Mr. Smith were impelled by honest motives he could have written to us disclaiming any desire to steal our name and business as early as May 30, and more than a week before he was called upon by a U. S. Inspector. The facts may therefore be epitomized as follows:

1. Said Smith wrongfully advertised to do business under the name and title of the INVENTIVE AGE.
2. Said Smith claimed by his advertisements to be the publisher of a "vast edition" of the INVENTIVE AGE, and his own admissions show that he never published any such paper at all and ordered printed a measly edition of 2,000 copies only.
3. Said Smith when he discovered that he was using our name wrongfully and unlawfully continued to use the same until he

was called upon for investigation by a U. S. Post Office Inspector, whereupon fearing that he had carried his game too far, he hastened to save himself by writing his letter of June 6th before referred to.

4. Said Smith's methods of doing business are not of a character to entitle him to the confidence of inventors, and we do not hesitate to pronounce his alleged "Inventive Age" as a thing that never had any existence except in his stupendous imagery.

ASSOCIATION AMERICAN INVENTORS.

In this connection it will not be out of place to refer to an institution pretending to do business under the title of the "Association American Inventors, George H. Holgate, general manager, Philadelphia." This institution offers to obtain patents on the "installment plan" and assumes to sit in judgment and award diplomas to meritorious inventors free of charge when they place their business in its hands. Under dates of Dec. 11 and 14, 1893 this institution wrote Mr. Jas. A. Watson, an inventor of Washington, D. C., urging him to place his patent in its hands if he desired to realize large sums of money thereon, and solemnly announced that,—

After due consideration we have come to the conclusion that we are in position to aid you very materially in the sale of your patent *** We have lately negotiated with the largest commercial agency in the United States for 47,000 names *** of investors, presidents of banks, boards of trade and chambers of commerce *** Now that the Senate has repealed the silver bill the business interests of the country will revive and investors will be seeking investments for the money they have kept locked up *** and we will *** make a reduction in your case and take one-half of our fee in advance *** We wish to emphasize one fact *** and that is that your patent is not worth one cent until you have realized something from it, or in other words, when you hear the jingle of the other man's money in your pocket, then you are certain that your patent has value.

Jingle is very good indeed. Jingle of other man's money in your pocket is the life and sole of every fakir from the country fair soap vender to the senatorial "leg-puller." Mr. Holgate is something of a humorist, and we suggest that he should change the name of his institution to the Association of American Humorists. "In the last few days," says Mr. Holgate, we have sold patents to the extent of over \$350,000, and "we have also just started on a half million dollar company which we expect to raise in a very short time." A trifling matter of a half a million or so is as nothing to Mr. Holgate whose superb talents are capable of raising anything from a wooden nutmeg to a device for salting down sun beams for future use, in the darker regions. 'Tis well that Col. Sellers is of the past. Were he alive today and allowed to gaze upon the vast possibilities of the Association American Inventors, he would pine away with envy into innoxious desuetude and die of a broken heart. (This name was doubtless selected with a view of having it confused with that of the "American Association of Inventors and Manufacturers," a well known legitimate organization composed of the leading inventors and promoters of the country.)

PAUL JAMES GREGORY.

Under date of June 11, 1894, we received a letter from Mr. Horatio J. Brewer, general manager of the Leclanche Battery Co., of New York, enclosing a letter received by him from one "Paul James Gregory, patent broker, Marilla, N. Y., and Buffalo, N. Y." Mr. Gregory in his letter, which is under date of March 14, 1894, places the small value of \$70,000 on Mr. Leclanche's invention, and offers to sell the same on the usual terms and a trifling advance fee of \$20. He says he has the addresses of 49,000 manufacturers "who have actually bought patents"—just think of it—and who are tumbling all over each other to buy more patents and especially the \$70,000 patent of Mr. Leclanche, provided he places the sale of it in Mr. Gregory's hands and advertises it in a "vast edition" of Mr. Gregory's "Patent Investors' Bulletin." He wants the sale of the aforesaid valuable patent "at once or not at all," and forsooth the inventor may be caught napping by other irresponsible agents, he is cautioned to beware of swindling patent concerns that have sprung up in the west and who slander their honest competitors. "He who cries stop thief," says Mr. Gregory, is the thief himself," little thinking doubtless when he penned that truism, that he was convicting himself by crying stop thief loudest of all.

AN INTERNATIONAL CONCERN.

Another institution that may be referred to with profit here is the "International Patent and Technical Bureau of Reichelt and Oltsch, South Bend, Ind." with offices in "Dresden, Berlin, Bruxelles, London, Mexico, Rio de Janeiro, Valparaiso, New Zealand, Melbourne, Sydney, New South Wales, Vienna, Paris, Milan, St. Petersburg, Stockholm, and Madrid." This institution by neglecting to establish offices in Saturn, Jupiter, Venus and Mars and a few other straggling planets allowed an important field of the solar system to fall into the hands of "disreputable" competitors, and is therefore obliged to confine its business to the single and solitary planet upon which we move and have our being. This is to say the least unfortunate. But it

is refreshing to learn from a letter from the International Patent and Technical Bureau, addressed to Mr. James A. Watson, of Washington, D. C., that it has special facilities for the sale of his patent, which it values as worth at least \$10,000, and that if he is not in a condition to pay the small preliminary expense, he shall try to secure a partner who will pay the costs and share the profits, and advises the inventor to make such prospective partner a fair offer—"say 50 per cent from the sales." Of course a little matter of 50 per cent would be a mere drop in the bucket and nothing to the inventor as compared with the importance of the trifling fee that would result therefrom to the Mundane International and would be Interplanetary Bureau of Patents and Humbugs.

THE ADAMSON COMPANY.

Another institution that claims special facilities for procuring and selling patents is the "Adamson Company" with its "Central Executive Office" at Muncie, Indiana and various branch offices at such small towns as Chicago, Washington, D. C., and Boston, Mass. The inventor pays a preliminary fee of \$20, and the Adamson Company does the rest. As delays are often dangerous, it writes an inventor to wire lowest cash price for his patent, and follows with another letter saying: "We feel it our duty to advise you that there is now a great improvement in the market and demand for patent investment, and the best of the season is at hand," and that it is employed by a "large number" of the leading manufacturers who stand eagerly waiting to snatch up new and valuable inventions at fabulous prices.

PARISIAN INVENTOR'S ACADEMY.

The old world is not behind the occident in so-called patent agencies of this character. Paris and London, both have their share. In the former city the "Parisian Inventor's Academy, A. Pitra, general secretary," professes to issue medals and diplomas to deserving patentees and to confer honorary titles, etc. But, says the letter of the secretary to an American inventor, "this honorific title will be of no expense for you, only if you would be desirous to receive the medals and diploma, you would have to send us a money order of ten dollars, to cover admission, etcetera." Here the "etcetera" seems to be the chief desideratum, but just what multitude of sins, the aforesaid etcetera is supposed to cover, is doubtless beyond the capacity of any one save the French secretary to find out. It is known however, from the fact that A. Pitra himself hath said it, that the ten dollar fee covers, the "Great Gilded Medal." Now the said "Great Gilded Medal" is doubtless something that no well regulated American patentee can well afford to do without. Anyone who has tarried under the seductive influence of an aboriginal pow wow within the sacred confines of the noble red man's teepee in the far west knows what a talisman for good is the Great Horn Spoon. We cannot assert with absolute authority, but we have every reason for concluding that the "Great Gilded Medal," of the aforesaid Parisian Inventor's Society is something closely akin to the Great Horn Spoon, and that therefore, it is something that every inventor should seek to possess himself of at the earliest possible date.

The foregoing suggests its own conclusions. We expect to have more to say on this subject at another time, and we invite our readers to send us any facts or literature that may aid us in our investigations along this line.

Boring Under Pavement.

A recent Buffalo paper contains a description of the new device for boring under the pavement through clay or stone, invented by Walter E. Everett, of that city. This invention obviates the necessity of tearing up asphalt or other pavements for the purpose of making gas and water connections. It consists of a series of drills or augers. The base of the machine is fitted with a track to the full length of which, about four feet, the gears travel. The augers are two feet long, and when one is in to its full length, the shaft is released and the carriage travels back, allowing the insertion of another auger, of which 15 go with one machine. The excavated earth, for the most part, travels back in the groove of the auger, after the manner of the carpenter's auger.

"Two Tours to the North" is the title of a little booklet issued by the Pennsylvania Railroad Company, giving the itinerary of two personally conducted tours, embracing Watkins Glen, Niagara Falls, Thousand Islands, Montreal, Lake Champlain, Saratoga and other interesting points. The first trip covers the period from July 17th to 30th and the second from August 21st to September 3rd. These tours are considered among the choicest of the season and are quite inexpensive.

Paris Underground Electric Railway.

For twenty years projects for an underground railway similar to the Metropolitan road of London, have been under discussion in Paris, but one after the other they have been dropped, with a single exception. This latter enterprise, which contemplates the construction of an underground electric road from Bois de Vincennes to the Bois de Boulogne, was substituted to the Parisian authorities by M. Berlier in 1887. It was examined by the municipal council but for one reason and another no action was taken until July 1891 when this body decided to investigate its merits. A favorable report was made despite the fact that objections to the plan were made by surface companies and by the promoter of a rival project. The Berlier plan commended itself to the authorities because its execution did not involve excavations in the public streets

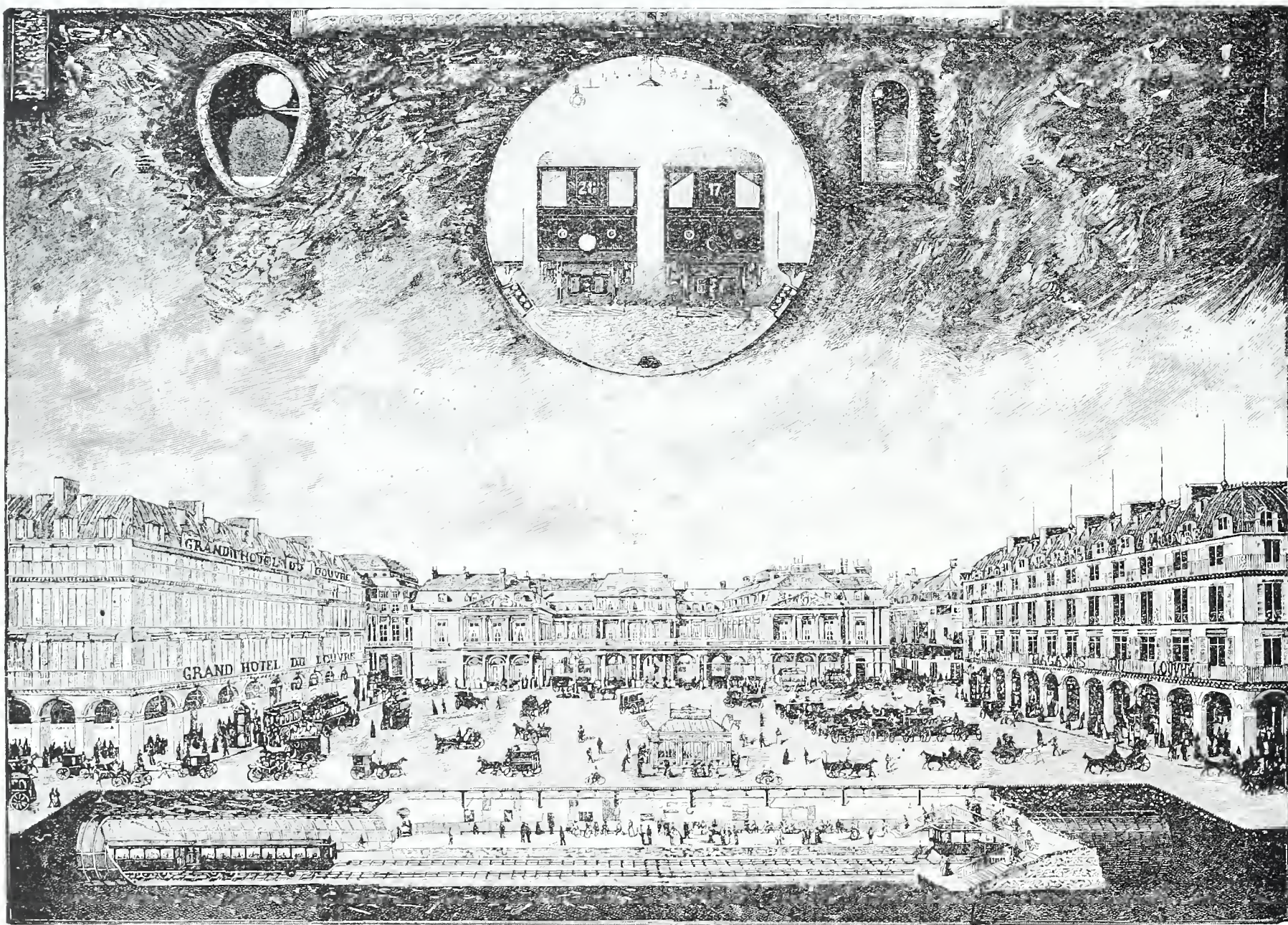
tion, placed midway between the rails and mounted on glass insulators. The current is picked up by a sliding shoe. The rails constitute the return path.

Passengers will be carried in single cars or in trains of two or three cars in accordance with the demands of the public. Each car will seat twenty five persons. The speed of the trains will be about $12\frac{1}{2}$ miles per hour and the trip from terminus to terminus, *i. e.* from the Bois de Vincennes to the Bois de Boulogne, will occupy $37\frac{1}{2}$ minutes including stops at stations. There will be fifteen stations in all at each of which it is estimated twenty seconds will be lost in stopping. The length of the road will be slightly over seven miles. Over that portion on which the most of the passengers will enter and leave the cars trains for the greater part of the day will run every two minutes; on the rest of the road trains will run on a four minute schedule. It is

German Theft of American Genius.

German piracy of American inventions is a common complaint, and under the peculiarity of the German patent laws is possible to an exasperating extent. The appreciation on the part of the shrewd German of a good thing in the shape of an American invention, is equalled only by the alacrity with which he proceeds to appropriate to himself the benefits of another's invention. A case in point is reported to the State Department by J. C. Monaghan, United States consul at Chemnitz. He says:

Some time since a manufacturing company of the United States wrote me relative to a Chemnitz man who had bought six of their pumps, alleging a purpose to sell them here and asking an exclusive agency, requesting at the same time that the company put his shield on the machines. He had seen the pumps at Chicago, liked them, and looked up the company on his way back. It is needless to say



THE PARIS UNDERGROUND ELECTRIC RAILWAY.

and because it was proposed to operate the railway by electricity.

The construction of the line will be practically the same as that of the City & South London railway. As in that case the work will be conducted on the Greathead system, the walls of the tunnel being formed of steel tubing. The fact that in this construction it is not necessary to open up the street for long distances is considered of the utmost importance, as the municipal council flatly refuses to consider any plan the execution of which will interfere with the use of the public ways. In the construction of the stations, which will necessitate work on the surface, plans similar to those followed when streets are paved or repaired will be adopted and pedestrians and persons with vehicles will be subjected to very slight inconvenience. The council will not allow much use of the surface for stations in the central part of the city. A structure which will serve as a shelter for the stairway leading to the platforms below will be all that will be permitted. In the Berlier system the current is carried along the way by a conductor rectangular in sec-

tion, placed midway between the rails and mounted on glass insulators. The current is picked up by a sliding shoe. The rails constitute the return path. The coaches will be divided into compartments like the railroad coaches of England and the Continent, but whether they will be divided into first class and second class is not definitely decided.

The accompanying illustration, furnished by the Street Railway Gazette, Chicago, indicates the general features of the system.

Aluminum Bronze.

What is known as "aluminum bronze" has ten per cent aluminum and ninety per cent copper, and possesses a tensile strength of 90,000 pounds, an elongation of fifteen per cent, and will cast, forge, roll, draw into wire, or work in a lathe about as well as steel.

that the Chemnitzer is not an agent, but a manufacturer; that his intention was to take the machines apart, construct others like them, and get all the good out of such sales as he could before somebody else should forestall him in his purpose. Upon receipt of the letter I looked up the matter, found my suspicions confirmed, and after some trouble got and sent the company the information, plus one of the Chemnitzer's own catalogues. The company wrote again asking whether the Chemnitzer was making the pumps or not, and I learned upon inquiry that he boasts about how he got his pumps, and that he intends to get more American machines in the same way and copy them.

Of the six bought of the company in question he sold four. These serve as excellent advertising pumps. The other two serve as models. He is making fourteen, or was a week ago.

I deem it my duty to tell all this to the department, because so many Americans neglect to take out foreign letters patent for their machines.

The Chemnitzer of whom I have spoken says he can make his pumps, *i. e.*, the American company's triplex pump, 20 to 25 per cent cheaper than he can get them from the company, and that Germans prefer to buy German made rather than foreign goods. He says further that he hoped to hold the home market by keeping the company's pump out of the hands of his competitors in the empire.

SCIENCE FOR YOUNG PEOPLE.

Conducted by E. P. LEWIS.

When one body is warmer than another we say that its temperature is higher. Temperature then measures intensity, not quantity, of heat. Everyone knows how ordinary temperatures are measured. A glass bulb, with one end drawn out into a fine tube, is filled with mercury or some other liquid to a point in the tube, and the liquid is then boiled. As soon as the air has been completely driven out by the vapor, the end of the tube is sealed by melting the glass in a flame. The bulb is placed in melting ice and a mark made on the stem where the liquid comes. Then it is put in the steam over boiling water and another mark is made. The space between is divided into 180 parts called degrees in a Fahrenheit thermometer, and 100 degrees in a Centigrade thermometer, which is most used for scientific purposes. Air makes a much more accurate thermometer than any liquid, for heat expands it more.

It is not so generally known how very small and very great differences of temperature are measured, and perhaps you would like to learn something about it. All the most delicate methods require the help of electricity. The first very sensitive instrument was the thermopile, which was used about sixty years ago by Melloni, an Italian physicist.

Suppose you solder two copper wires to the ends of a bent piece of iron, A C B, and connect these wires with a sensitive galvanometer at G. If you warm the junction A by holding your hand near it, a feeble current of electricity will flow around the circuit, and its magnetic effect as it passes around the galvanometer coil will cause the needle to move one way or another. The more you warm A the greater the effect. Any two different metals may be used, some pairs producing greater and some less effect. Each pair is called a thermal couple or element. By using several couples a greater effect is produced. The current is always very small, but galvanometers may easily be made which will show the ten-millionth part of the current that you can get from one ordinary galvanic cell, so that differences of temperature between A and B as small as one ten-thousandth of a degree may be measured. With a much less sensitive galvanometer very high temperatures may be measured. Professor Carl Barus, lately of our Geological Survey, measured temperatures as high as 1,700 degrees Centigrade with a couple made of the metals platinum and iridium, which melts at a very high temperature. This is about one-half the temperature of the greatest artificial heat that we can produce—that of the electric arc. The temperature of the arc has been estimated by knocking a piece of the glowing carbon into a vessel of water, and from the final temperature of the water and the weight of the water and the carbon calculating how much heat has been given to the water. The sun is probably much hotter than the arc.

A still more sensitive instrument is the balometer, which was invented about a dozen years ago by Professor Langley, now the Secretary of the Smithsonian Institution. It has been found that if we connect the poles of a battery by wires of different kinds but of exactly the same size and shape, we will get currents of very different strength. The property which causes this is called the electrical resistance of the substance. We know that water will flow faster through a smooth pipe than it will through a rough one of the same size. The friction acts as a resistance to the current. In just the same way some metals offer a greater resistance to the electric current than others. It has also been found that the resistance of a wire changes as its temperature changes. This is the property that Professor Langley has used in his balometer. Suppose a current starts from a battery B, branches on two wires at A which meet again at C and then flows back to B. The current is pushed along by what is called electromotive force or difference of potential, just as water currents are pushed along by pressure or difference of level. Now suppose a current of water flowed down hill through two pipes uniting again at C. If we connect two points, D and E, at the same level by another pipe it will fill with water, but no current will

flow, so that a little water wheel placed in it will remain at rest.

In just the same way, if the electric resistance of the wire AD is equal to that of AE, and DC to EC, or if the proportion AD:AE::DC:EC is true, then the point D is at the same potential or electric level as the point E, and if we connect these two points by a wire passing through a galvanometer we will find that no current passes through it, no matter how strong the current in the other wires may be. This arrangement is called a "Wheatstone bridge," and is in constant practical use in comparing different resistances. The balometer is a small Wheatstone bridge, and is used with a very sensitive galvanometer.

If the wires AD, AE and DC are well protected by a screen and heat is allowed to fall on EC, its resistance increases. The electric current will be "backed up" at E, which will now be at a higher potential than D. A current will at once flow through the galvanometer from E to D. The arms of the bridge, as the resistances are called, are usually made of very small strips of platinum, about one five-hundredth of an inch wide and one five-thousandth of an inch thick, so that they will answer quickly to temperature changes. This little instrument will show changes of one-millionth of a degree. Professor Langley has used it to study the invisible part of the spectrum of the sun, which he has found to extend over a space at least thirteen times as great as the visible spectrum discovered by Sir Isaac Newton. The change of resistance by heat has also been used to measure very great temperatures—that of a furnace. An instrument of this kind is Callendar's "platinum thermometer," which you may sometimes read about.

There is another instrument perhaps even more sensitive than the balometer. It was made by Prof. C. V. Boys, of England, who called it a radiometer. A thermal couple is made of two metals in the form of a loop, which is suspended by a fine fiber between the poles of a strong horse shoe magnet. If heat is allowed to fall on the junction B while A is protected by a screen, a current will flow around the loop, and may be quite

large, as the loop is very short and has a small resistance. A loop or coil in which a current is flowing acts like a magnet, so the loop is turned around by the attraction of the poles of the horse shoe magnet just as a little compass needle perpendicular to the plane of the loop would do. A little mirror on the loop throws a spot of light on a screen so that its motion may be observed. What kind of fiber do you suppose is used to suspend the little couple? It is made from a quartz crystal. Professor Boys was the first man to make these. The crystals are heated in an oxyhydrogen flame until they get soft, one end is then attached to an arrow while the other is held by forceps. The arrow is shot from a bow and draws the soft quartz in a long fine thread after it—so fine that sometimes it can hardly be seen by a powerful microscope. Professor Boys used many only one ten-thousandth of an inch thick, and some have been made which were estimated to be about one-millionth of an inch thick. The great advantage in their use is that they twist easily, and are much stronger than a steel wire of the same size. With this instrument Professor Boys detected the heat from a candle two miles away, and measured the heat from the moon. It will easily measure one-millionth of a degree. One of the best forms of a galvanometer for practical use—the d'Arsonval—is made very much like the radiometer, the current to be measured passing through a small coil suspended between the poles of a horse shoe magnet.

Other ways have been suggested for measuring very small and very great temperature, but no others are of much value.

American Shipping History.

Under this heading "Seaboard," one of the leading marine journals, publishes the following argument in favor of government steamship subsidies and protection to American ship owners:

American ships in 1789 carried but 23.8 per cent of our foreign commerce. The first Congress immediately passed two acts to benefit our shipping; the first imposing a higher duty on imports in foreign than American ships; the other charging foreign ships a tonnage tax over eight times higher than American ships paid. This increased our shipping from 123,893 to 346,254 tons the first year, our ships carrying 40.5 per cent of our foreign commerce. In 1794 our shipping in the foreign trade reached 438,863 tons and it carried 88.5 per cent of our foreign commerce. That year Congress taxed imports in foreign ships 10 per cent more than in American ships, and in 1795 our shipping had increased to

529,471 tons and our ships carried 90 per cent of our foreign commerce.

In 1826 American ships carried 92.3 per cent of our foreign commerce, while now we carry 12.2 per cent. This loss is due to the repeal of those protective laws and to treaties that give foreign ships the same rights as American ships in American ports.

Now is the time to abrogate those treaties. By again charging imports in foreign ships ten per cent higher duty than in American ships, millions of tons of ships would be built in American shipyards, not a cent would be paid to any American shipowner or shipbuilder by our Government, and we would again have a great foreign shipping. This plan has been tried successfully. No other has. Our foreign commerce pays about \$250,000,000 a year to ships in freight charges. The larger part of this can be made ours if we go back to first principles.

Women as Inventors.

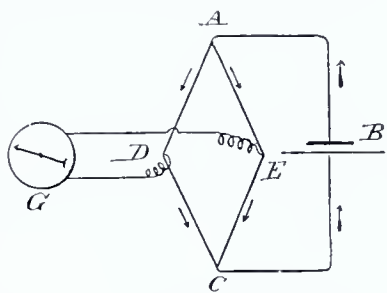
At the World's Columbian Exposition a serious effort was made to collect the number of mechanical inventions patented by women. The result was not encouraging. In the Woman's Building were gathered a great number of interesting objects, but I have heard many intelligent women say that the place had a melancholy effect on their minds from the lack of originality. It is very easy to say that women have had no chance, but that is not true. Every industry of the world involves the following activities.

1. Taking from the earth, waters and the air natural material.
2. Utilizing the powers and principles of Nature in manufacture.
3. The carrying trade.
4. Commerce and exchange.
5. Consumption of the product finally or as starting material for new sets of industries.

The work that each one is doing belongs somewhere there. Now, in primitive life, the Indian women of the District of Columbia took fish from the waters, plants from the land and the inhabitants of the air. They also quarried siliceous stones, soapstone and paint. They were unacquainted with the powers of wind, water, hard bodies and steam, so with their good right arms they performed the work of modifying Nature's gifts. They were cutters, pot makers, paint makers, harvesters, fishers, hunters, tanners, spinners, weavers, each woman being all of these. Of the carrying trade they held the monopoly. They were the beasts of burden. They could easily transport a hundred pounds to any distance. As for commerce and exchange, there was not much of that. If you looked on the side of the great bronze doorway of the Transportation Building in Chicago you saw as the *genius loci* a savage woman with a burden on the back, and all along overhead on the side of the structure as the ideal transportation beautiful women, floating in the air sustained and moved by their ineffable loveliness. Finally, the arts of consumption with this primitive folk, were entirely woman's work. She made all the clothing, houses, pottery, dishes, utensils, household furniture. She invented ceramics, cooking, the textile art, embroidery and leather work. The hearth, the bed, the roof, all the refinements of life were hers. Now, recall the Place of Honor in Chicago. Take your stand in imagination upon the peristyle. Upon your right were Liberal Arts, Electricity Mining. Upon your left, Agriculture, Machinery. The first continuous motion in the world was that of the spindle, savage woman's invention. Women were not excluded from the Machinery Hall, but precious few entered. The first gleaners of food and textile plants were women solely. Therefore, the figure of Atlas on the Agricultural Building was wrong. It should have been an Indian woman with a gleaming basket on her back. In the Manufactures Building the French were more subtle, for the grand facade of their exhibit was borne up by women, and above the entire German space sat Germania, a lovely, stalwart Teuton woman. I have spoken of women as being among the first miners and I need not tell the readers of THE INVENTIVE AGE the presiding genius of frictional electricity is Hestia or Vesta. While, therefore, the attempt to separate woman's work from man's at Chicago was a failure, the blending of woman's work with man's was everywhere complete. Why do not women still play the role of inventors? Because the work of invention has gotten beyond their instincts. There is no reason in the world why, for instance, the piano, made almost solely for women, should not be improved and music composed for it by women, except that they do not want to take the trouble. So they have dropped out of the procession of inventors in arts which their great grandmothers originated.

O. T. MASON.

Mr. WALTER WELLMAN, who expects to explore the regions around the North pole during the coming summer, has reached Tromsø, Norway, and expects to leave that point for Spitzbergen earlier than was expected when he left America.



NEWS CONDENSED.

JUNE 1.—Somerby and other Iron Hall officials were indicted by the grand jury at Philadelphia. The Immigration Bureau notified the immigration authorities at all American ports to look out for immigrants engaged to work in the Pennsylvania coke and coal regions. The floods in the Frazier river valley caused great loss and rendered many families homeless.

JUNE 2.—Col. Breckenridge has lost his right to appeal by failure to conform to legal requirements. Second Assistant Postmaster General J. Lowry Bell resigned. The U. S. warship Baltimore was ordered to Corea to guard American interests. Troops were ordered out in Indiana to prevent outbreaks by striking miners. The so-called tax inquisition law of Ohio was declared unconstitutional by Circuit Judge Ricks. M. Casimir-Perier was elected president of the French Chamber of Deputies.

JUNE 3.—The car works at Laconia, N. H., burned; loss \$100,000. Ottumwa, Iowa, was visited by a \$225,000 fire. Counsel in the case of Pendergast, the assassin of Mayor Harrison, agreed upon postponing the trial until fall. Mr. Gladstone has nearly recovered from the operation on his eyes.

JUNE 4.—Charles Neilson, of Maryland, was nominated to be Second Assistant Postmaster General vice Bell resigned. Ex-Governor C. C. Van Zandt, of Rhode Island, died. Great damage by floods reported from Portland, Oregon. Striking miners in West Virginia and Ohio are burning bridges and doing much damage. The revolt in China is gaining headway. At Boise, Idaho, a party of Coxeyites were sentenced to three months' imprisonment for train stealing. In Indiana and Illinois the militia was ordered out on account of striking miners.

JUNE 5.—Gov. Cleaves was renominated by the Republicans of Maine. In Oregon the Republicans carried the elections by overwhelming majorities. Coxey accepted the nomination for Congress in the eighteenth Ohio district. The separate coach law was declared unconstitutional by Judge Barr of the U. S. Circuit Court at Owensborough, Ky. The Italian ministry has resigned.

JUNE 6.—The annual meeting of the American Association of Mechanical Engineers met at Montreal. Kansas Republicans nominated Ex-Congressman E. M. Morrill for Governor. Charles L. Hawley was nominated for Governor by the Pennsylvania Prohibitionists. Brazilian insurgents were defeated by the government troops.

JUNE 7.—Prof. W. D. Whitney, the eminent philologist of Yale, died. On her trial trip the Minneapolis was proven to be the fastest cruiser in the world. A band of 300 Coxeyites, mostly foreigners, started for Washington from Chicago. Thousands of miners and their families are reported to be in a starving condition in Sicily. In eastern Ohio the militia cleared the railroad tracks and quieted the strikers.

JUNE 8.—In attempting to cross the Platte river in Colorado fifteen Coxeyites were drowned. The House Committee decided to report a bill for the control and completion of the Nicaragua canal by the government.

JUNE 9.—In Montana nineteen commonwealers were sentenced to 90 days in jail. Richard Croker, the Tammany leader, sailed for Europe suddenly. The coal strike in Iowa was settled. A fire in a lumber yard at Dubuque, Iowa, destroyed property to the value of \$600,000. A proposal for inserting in the Swiss constitution a paragraph affirming the right of every male citizen to be employed, was defeated on the referendum. The French Chamber of Deputies voted 1,800,000 francs to protect the French frontier in Africa.

JUNE 10.—The eight hour labor law of Nebraska has been declared unconstitutional. Coxey, Browne and Jones were released from jail at Washington. Later reports show that 15,000 people were made homeless by the floods in the Frazier river country.

JUNE 11.—The name of Col. W. C. P. Breckenridge was dropped from the honorary membership of the Union League Club, Chicago. Muley Hassan, Sultan of Morocco, is dead. The International Fire Congress met at Berlin.

JUNE 12.—The trial of Erastus Wiman began in New York. Ex-Governor Geo. Peabody Wetmore, Republican, was elected by the Rhode Island legislature to succeed Senator Dixon. E. O. Picking was nominated by the Kansas Prohibitionists for Governor. A successful test of 17-inch armor plate took place at Indian Head. The deaths from the plague at Hong Kong average 100 per day.

JUNE 13.—Of the 110,000 Chinamen said to be in this country, 107,000 have been registered. The Kansas Populists renominated Gov. Lewelling, and inserted a women's suffrage plank in their platform. A committee to investigate the Padrone system was appointed by Secretary Carlisle.

JUNE 14.—At Los Angeles, Cal., 170 Coxeyites were sentenced to four months in jail for stealing. Geo. D. Epps was nominated for Governor by the New Hampshire Populists. In Delaware the Prohibitionists named Thomas J. Perry for Governor, and in Wisconsin J. G. Cleghorn was nominated. Lord Chief Justice Coleridge, of England, died.

JUNE 15.—Erastus Wiman was convicted of forgery in the second degree. The Coxey commonwealers make preparations to remain all summer at Bladensburg, Md. The British House of Lords rejected the bill legalizing the marriage with a deceased wife's sister by a vote of 129 to 120.

JUNE 16.—Ex-Congressman Thos. M. Bayne committed suicide at Washington, D. C. Striking miners in eastern Ohio and West Virginia decided to return to work. The albatross of the Central Stock Yards and Transit Co., Jersey City, burned with 6,000 sheep; loss \$1,500,000. Twenty-three Coxeyites at Fairfield, Ill., were sentenced to jail for train stealing. An anarchist at Rome fired two shots at Premier Crispi. Over 8,000 persons have fled from Hong Kong on account of the plague.

JUNE 17.—William Walter Phelps died at Englewood, N. J. It is estimated that the losses due to the strike of the coal miners will aggregate \$23,000,000. The corner stone of the new cathedral in Berlin was laid by Emperor William.

JUNE 18.—Commander John W. Easley, U. S. N., retired, died in Washington. The woolen mill at Dolgeville, N. Y., burned; loss \$60,000. The State Department was informed that all was quiet at Bluefields.

JUNE 19.—At Leonard 121 Commonwealers were fined \$20 to \$50 each, and sent to the various county jails. The Ohio Supreme Court declared the law of semi-monthly payment of wages to employees unconstitutional. The National Council of Junior Order of American Mechanics, began its 20th annual session at Asheville.

JUNE 20.—U. A. Woodbury was unanimously nominated for Governor of Vermont, by the Republican State Convention. M. M. Estee was nominated by the Republicans of California for governor. Proceedings to determine the sanity of Pendergast, were begun at Chicago. The 28th annual convention of the American Society of Civil Engineers was begun at Niagara Falls. Erastus Wiman, convicted of forgery in New York, was sentenced to 5 years and 6 months in Sing Sing. Ex-Senator Bishop W. Perkins, of Kansas, died suddenly in Washington. An earthquake at Yokohama caused much damage.

JUNE 21.—The American Railway Union at Chicago, endorsed the People's party. Nebraska Democrats organized a Free Coinage League at Omaha. The cruiser Montgomery went in commission.

JUNE 22.—The anti-cigarette law was declared constitutional by

the Ohio Supreme Court. The American Railway Union decided to boycott the Pullman cars, unless the company consents to arbitrate with its striking employees. Texas Populists nominated Judge T. L. Nugent for governor. Mrs. Lizzie Halliday, convicted of murder at Monticello, was sentenced to be electrocuted in August.

JUNE 23.—Adjutant Gen. Tarsney was tarred and feathered by masked men at Colorado Springs, Colorado. Thirteen of the 43 coal miners arrested at Mt. Olive, Ill., for holding up a train, were sentenced to jail for 20 to 90 days.

JUNE 24.—General Frye's Commonwealers to the number of 125 from California, joined the Coxey army near Bladensburg, Md. By the sinking of a tug off Atlantic Highlands, New York City, 20 persons were drowned. President Carnot of France was fatally stabbed by an anarchist in Lyons. Twenty-five thousand Socialists in Vienna, declared in favor of universal suffrage.

JUNE 25.—Employees of the Pullman Car Co., struck at St. Louis and other points. The trouble with coke strikers near New Haven, Pa., continues. The British Court went into mourning for a week out of respect to the memory of President Carnot.

JUNE 26.—Senator Cameron sent a letter to the National Republican League, urging the Republicans to favor free silver. Representative Springer was re-nominated. A boycott on Pullman cars was ordered by the Railway Union. Great disorder occurred in the French Chamber of Deputies on the attempt to elect a successor to President Carnot.

JUNE 27.—The Pullman boycott extends among railway employees all over the west, and the trains on many roads out of Chicago are tied up. Casimir-Perier was elected president of France. Illinois Democrats declared for Franklin MacVeagh for U. S. Senator. Wm. M. Singlerly was nominated for governor of Pennsylvania by the Democrats. The Republican League Convention at Denver, declared in favor of silver.

JUNE 28.—The Pullman boycott is extended, and the greatest strike ever known is promised. The income tax feature of the tariff bill, received an overwhelming majority in the Senate. A cyclone in western Minnesota and South Dakota killed ten persons and injured twenty more. Admiral Wm. Grenville Temple died in Washington.

JUNE 29.—The tariff bill was reported to the Senate, with income tax feature and repeal of reciprocity incorporated. Col. Parsons, owner of Natural Bridge, Va., was shot dead by Thos. A. Goodman, a conductor on the Chesapeake & Ohio Railway, for alleged defamation of character. The grand jury in Washington found true bills against Brokers Chapman and Macartney, who refused to answer certain questions in relation to the sugar trust before the Senate investigating committee.

Books and Magazines.

A revised and enlarged edition of "The Co-operative Commonwealth," by Lawrence Gronlund, the French exponent of Socialism, has just been issued from the press of Lee & Shepard, publishers, New York. The author, in his introductory, expresses the belief that what Jules Simon was pleased to call the "riddle of the nineteenth century," is likely to be solved by Socialism during the last ten years of the period. All that is needed is to convince the masses that the anticipated change in the whole social fabric of the world is God's will. The book is on the order of Bellamy's "Looking Backward," from which the author seems to have received much inspiration. It is a pretty picture of ideal human existence and social equality, and not lacking in forcible arguments against existing tendencies to arrogant aristocracy.

* * *

A new monthly journal has been started in Berlin specially intended as the organ of the electro-chemical and electro-metallurgical industries. The new journal, which is entitled the "Electrochemische Zeitschrift," is edited by Dr. Neuburger, and is published by Dr. N. von Klobukow through Fischer's Technologischer Verlag, Berlin. A long list of contributors has already been prepared.

* * *

"The Limitations and Operation of the Constitution of the United States as Affecting the Subject of Trade Marks," is the name of an exhaustive paper carefully prepared and read by Rowland Cox, the well-known New York attorney at the World's Congress Auxiliary of the Columbian Exposition. It has just been issued in pamphlet form, and is an important and useful addition to trade mark literature.

* * *

The receipt of the 42d annual report of the trustees of the Boston Public Library is acknowledged. The report shows that the library has grown from 390,982 volumes in 1880 to 597,152 volumes in 1893.

* * *

A new work on electrically propelled boats is about to issue from the press of C. C. Shelley, New York City. The author is Mr. Thos. Commerford Martin, the well known author of several electrical books and editor of the Electrical Engineer. This work will probably be the most exhaustive ever published on the subject treated and will also include some chapters by Joseph Sachs on the operation of canal boats by electricity.

* * *

With the compliments of "Public Opinion" comes Group No. 5, of the series of Albortype reproductions of the photographs of fifty prominent contributors to magazine literature. This is the most interesting of the whole series.

* * *

Elbert Hubbard utters a much needed, forceful protest of common sense in the June Arena against the villainous and bigoted insane movement of the

A. P. A., which is seeking to stir up hate in our country between our Catholic and Protestant brethren. He calls his paper aptly enough, "A New Disease," and shows how it is parallel to other nervous diseases which from time to time become epidemic in the community.

* * *

Readers of the "Public Opinion" must have noticed a change in the tone and general make up of that paper of late. Under the new management no radical changes have been effected, but new blood has been infused by new contributors and "Public Opinion," the busy man's paper, stands without a rival in its field.

* * *

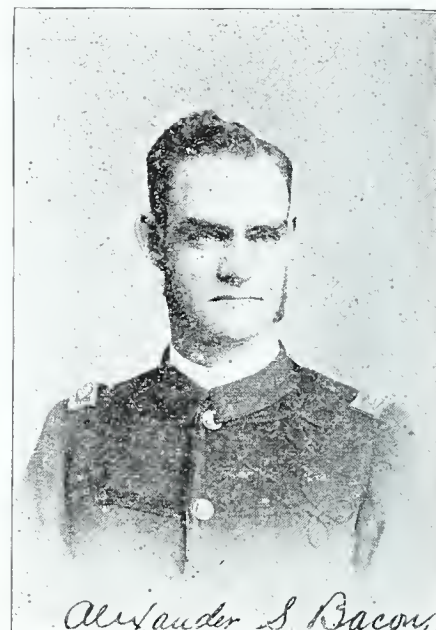
Could all who contemplate a summer outing realize the beauties of the National Yellowstone Park, there would be no hesitancy about deciding where to go. The little booklet issued by Chas. S. Fee, the aesthetic general passenger agent of the Northern Pacific railroad company, St. Paul, beautifully illustrates and graphically describes the magnificent scenery and interesting points of interest along this great trans-continental line. The National Park is the greatest of natural resorts—a veritable wonderland, the beauties of which even the pen of the versatile Olin O. Wheeler cannot exaggerate.

* * *

That pithy little weekly publication "Progress," conducted by Mr. W. A. Hungerford, in the interest of advertisers and Washington business enterprises, has found its efforts appreciated and eight pages has been added to its size.

The Governorship of New York.

It is evident that following the overthrow of the John Y. McKane political ring, and the shaking up of Tammanyism by the investigation now in progress in New York, an effort will be made to elect a governor this fall who will be satisfactory to the business and reform element of the State. In New York city the business men are urging the candi-



dacy of Col. Alexander S. Bacon, whose portrait is presented herewith. He is a resident of Brooklyn; a Colonel of the National Guard; a graduate of West Point, and has been active in all religious and benevolent works. He is represented as being a lawyer and an orator and in every way qualified for the position of chief executive of the Empire State.

The New Chicago River Tunnel.

The Van Buren street tunnel under the Chicago river has been completed after four years work. The tunnel will be used for the West Chicago Street Railway only, and not for ordinary traffic. It is quite lengthy and passes beneath a net work of twenty-one railway tracks and several large buildings as well as the river. It passes directly beneath a seven-story and basement brick building on the west side and a six-story building on the east side of the river. In constructing the tunnel it was found necessary to take down this seven-story building and afterward rebuild it. On the east side the tunnel has a uniform grade of 10 per cent for 499.1 feet. At the river the grade is flattened to 1.81 per cent each way from the center, the distance being 210.86 feet. The west side of the tunnel, 487.44 feet, has a grade of 5.46 per cent, and the approach, 316.5 feet, a grade of 7.93 per cent.

Names of Patent Solicitors.

Names and addresses of attorneys practicing before the United States Patent Office, carefully compiled by Virginia W. Middleton, for sale by the INVENTIVE AGE; cloth \$1.50; paper \$1 Edition limited.

PATENT DECISIONS.

GREENFIELD VS. PRENTICE.

This was an interference case in the Patent Office and was published in vol. 67 O. G. page 1189. Greenfield an electrician and inventor, had been attempting to construct a certain machine and failed, and thereafter sought Prentice, an expert machinist and inventor, whom, he had been informed, had invented a machine similar to the one with which he was interested and Greenfield confirmed his information by examining a model of Prentice's invention. At the same time Greenfield showed Prentice a rough wooden model of the machine which he had constructed. This machine of Greenfield was, however, impracticable and was entirely unfit for the purpose for which it was intended. Subsequently Greenfield agreed to furnish the labor and material if Prentice would build a machine. The understanding was that if this machine was successful Greenfield would pay a royalty on the product, to which agreement Prentice consented, provided, Greenfield would pay him mechanic's wages for the time during which he worked on the machine. Under this agreement Greenfield engaged Prentice to build the machine. These being the facts the Commissioner held, and it is thought correctly, that Prentice was the prior, or rather the true inventor of the machine. This ruling is based on a well established principle of patent law. Where an inventor has mapped out or invented the essential features of an invention and employs a skilled mechanic to embody his ideas in a practically operative machine, any suggestions or improvements which the mechanic makes will accrue to the inventor's benefit, unless the suggestions or improvements amount to a separate invention. Then, of course, the production is due and belongs to the mechanic. In the Greenfield vs. Prentice case the improvements which the latter offered were construed to amount to a separate invention, since Greenfield's machine was inoperative and therefore unpatentable, so that it necessarily followed that Prentice was the inventor of any operative machine which he produced. What interest or right Greenfield would have to the invention is another matter and the question did not arise in this case.

HUMPHERY'S HOMEOPATHIC MEDICINE CO. VS. HILTON.

In this case, a suit involving the validity of a trade mark and published in vol. 67 O. G. page 1194, the United States Circuit Court for the Southern District of New York decided that mere numerals are not valid trade marks. This rule seems to be established by authority other than this decision, since Browne in his work on trade marks lays down the rule that numerals cannot be considered as trade marks unless they are invested with some collateral characteristics which give them an arbitrary cast. Trade marks must be arbitrary symbols, devoid both of deceptive and descriptive features. It was determined that the numerals used as by the Humphery Co. were descriptive. Probably a single numeral applied to an article of trade would make a lawful trade mark and this view is not incompatible with the decision, since Humphery had a series of specifics and marked them 1, 2, 3, etc. If now, he had marked them all with a single numeral using it in its arbitrary sense, as it certainly would be used, it is not seen that there could have been any valid objection; but it is not competent for a person to designate a series of articles by separate numerals and claim therefor the protection which the trade mark law affords. He could, it would seem, claim as a series trade marks the separate numbers which are applied to the respective remedies, but he could not claim the broad idea or system, as was attempted in the above quoted case. While the court did not go this far in its decision, it is thought that the rule here given is in perfect accordance with those well-settled principles which compose the trade mark law.

GATES IRON WORKS VS. FRASER *et al.*

This was a case which received adjudication by the Supreme Court on appeal from the Circuit Court of the U. S. for the Northern District of Illinois. The decision was published in vol. 67 O. G. page 1065. In this case the respective patents to John H. Rusk, and P. W. Gates, were declared invalid. In the Rusk patent the point involved was the use of the safety pin for receiving the undue strain in ore crushing machines and saving the machine from the detrimental action thereof. Rusk used the same pin for an ore crusher as others had used for different machines and the new use was held not to be patentable. This rule is well settled and has for its exception the case where the new use changes the principle or mode of operation of the machine. Here with

the change of the principle a new machine is produced and consequently a patentable invention. Gates had several patents; two were declared invalid on the ground of prior use and sale of more than two years before the application. It was proven that one Brown built and used a machine similar to Gates, more than two years before Gates' application which fact will invalidate Gates' patent. A third patent to Gates was declared invalid to the extent of one claim on the ground of each of the inventions. The invalid claim was for the use of a soft metal bearing box used with an ore crushing machine and since the use of such boxes was old in other machines the change was held to be productive of no invention. This case was very similar to the condition attending Rusk's patent, and the ruling was based on well established principles of patent law. The only way in which the new use could have conferred patentability was by changing the principle of the machine, as explained above. All of these patents were owned by the Gates Iron Co., and were the basis of their suit. Since they proved invalid, however, the suit of the Gates Co. failed. This case was also the means of deciding or of re-affirming a point in assignment law. One Brown invented an ore breaking machine and orally promised to give the defendants in the suit an interest therein, subsequently he assigned to the Gates Co. It was held, however, that the oral agreement was not good as against the executed agreement with the Gates Co.

COLHOUN VS. HODGSON.

This was an interference case in the Patent Office, reported in vol. 67, O. G. page 1329. Colhoun filed a caveat on October 18, 1886, in which as the law requires in such cases, he made oath that the invention was incomplete. In his testimony in the interference, however, he says that in September 1886, he used the invention publicly in his canning establishment at West River, Md. His testimony is weak in fixing dates, while it might have been strong enough. The only evidence which he has is his own statement and the testimony of one, Miller, who was in his employment in 1886 and 1887, and who states that he remembers the use, but who fixes no date, so that the use might have been in 1887 as well as in 1886. These statements could not be given much weight since they were merely of an ordinary event dependent upon recollection only and not verified by any other testimony. Another fact which cast a shadow upon Colhoun's testimony, was the fact that his application was only filed after an interference between Hogson and one Smith, in which Hogson received a favorable decision. Subsequently Colhoun assigned to Smith, who now has Colhoun file the present application and pays all the expense incident thereto. On the other hand Hogson clearly proves to have conceived the invention as early as December 1st 1886, and to have reduced it to practice immediately afterwards. These being the facts the Commissioner held that the dates which Colhoun tries to establish were not proven and that the record shows a date no earlier than the date of Hogson's reduction to practice. Since Hogson used great diligence in perfecting his invention he was awarded priority over the negligence which characterized the actions of Colhoun.

SAUNDERS *et al.* VS. ALLEN.

The decision in this case was made by the U. S. Circuit Court of Appeals for the Second District, and arose out of a suit by Saunders *et al.* for the infringement of re-issue patent No. 10021 by James P. Allen. The feature of the invention rested in the use of an anti-friction roller to reduce the friction in a pipe cutter and it was held that this construction did not involve any invention over the common practice to use anti-friction rollers to dispense with friction, and over the showings of several prior patents which disclosed the idea, though not the precise construction. It was argued that the patent should be sustained because of the success which it met with when placed on the market, but the court held that the showing in this case was not sufficient, since there was no way to determine whether the demand and success was due to trade discounts and advertising or to actual merit. This view of the case seems to be original with the Court, and while the application of the rule might have been justified in this particular case, it is thought that the rule should be applied with caution. It has been long since established that utility and commercial success are of great weight, in determining the question of patentability when more positive evidence is not available, and any ruling which departs from this principle may, it is thought, be questioned.

JOHNSON *et al.* VS. JOHNSON.

This was a suit by the owners of the patent to M. H. Watson, for improvements in indexes, against the infringers thereof, and in their answer the defendant urged two defences, first that the patent was not for patentable subject matter, and second, that the index did not involve invention in view of the state of the art. Both of the defences were held to be insufficient; and regarding the question of not the proper subject matter, it was decided that an index came within the purview of the word "manufacture" as used in the statute, and was, therefore, patentable in subject matter. This decision is quite an important one, since it has always been an open question, whether an index was the proper subject of a patent, and the decision was the first authoritative ruling on the point. No reason is seen why this ruling should not always be adhered to, since the term "manufacture" embraces all products of manufacturing industry which are not arts, machines, compositions of matter, and designs, and since an index is clearly none of these, it must be a manufacture, and as such is patentable. The second defence was overruled and it was declared that the production of the device did involve invention, notwithstanding some references which were near approaches to it. The doctrine as to commercial utility was applied in this case, and the favorable decision was probably due to its influence. It was held that because the inventor had decided commercial advantages over all prior and competing inventions, its production must have involved invention. This rule is applied very often in patent cases, and the very frequency of its use and ratification establishes, it is thought, its correctness. This case was reported in vol. 67 O. G. page 1332.

AMERICAN CABLE RAILWAY CO., VS. THE MAYOR OF THE CITY OF NEW YORK *et al.*

This case was the means of deciding that a certified copy of an assignment as recorded in the Patent Office, if objected to at the proper time, is not competent evidence of title. In deciding this point the court probably established a precedent, which will prove of no little importance in patent matters. It has been universally the custom to rely upon the certified copies

of the Patent Office records for the establishment of the existence of assignments, and if this decision stands unquestioned or is not overruled, this practice will more than probably cease. It has been decided, and by what was always regarded as competent authority, that certified copies of the records of the Patent Office are prima facie evidence of the genuineness thereof; but the court maintained that these decisions were given in particular cases and were not of general application. On the other hand they cited a decision in which their view of the matter was taken. This case, however, treated the point only by *obiter dicta* and cannot be regarded as authority. An appellate review of the decision in the Cable Co. vs. Mayor, *et al.* case is looked forward to with a great deal of interest, since it is thought that some may question its correctness, the weight of authority being in another direction. The rule of the case is doubtless good in principle, but it may not be accepted on account of the presence of decided and numerous authorities establishing a negative rule.

EX PARTE GROVE.

This was a decision of the Assistant Commissioner of Patents, on a trade mark case brought before him on petition from the Primary Examiner. The question involved was the validity of a registration of the word "Bromo-Quinine." It was contended by the applicant that the word was arbitrary and non-descriptive, and therefore a good trade mark, while the examiner maintained that it was not arbitrary and on the other hand was descriptive. This would make it an invalid trade mark. The decision was to the effect that the word Bromo and Quinine are names of chemicals, and that the use of these words would imply the existence of the chemicals in the compound to which they are applied. Therefore, the conclusion that the trade mark was descriptive. The applicant averred that the preparation contained no Bromo, or any variation or species thereof, and was not, for this reason, descriptive, to which the Commissioner answered, that if this was the case the trade mark was deceptive. Such an attribute makes a trade mark invalid; and for these reasons registration of the mark was refused, and the examiner's decision consequently affirmed.

SOCIAL REGISTER CO., VS. HOWARD.

This was a bill in equity by the Register Co., asking an injunction restraining the publication of a pamphlet called Howard's Social Register, and addressed to the U. S. Circuit Court, District of New Jersey. For many years the complainant has published in New York a register or directory of the names and addresses of certain persons living in New York and vicinity, calling the publication "The Social Register." The register soon became well known, and proved to be of great value to the persons interested in the social and personal standing of the residents of New York. The defendant, Frank Howard, now publishes a similar list, designating it "Howard's Social Register," for the restraint of which an injunction is asked by the complainant. The court held, notwithstanding the adverse contention of the defendant, that the words "Social Register" were the proper subject of a valid trade mark, and therefore granted an injunction, ordering the discontinuance of Howard's register. This decision has not yet been reviewed by an appellate tribunal, and its validity has not, therefore, been questioned.

THE KNICKERBOCKER VS. ROGERS *et al.*

This case was a suit at law and based on the several patents to Orville Morse for improvements in dust collectors, and complaining of their infringement. The defendants denied infringement and also the patentability of the invention. It seemed that infringement was clear, if that is to be deduced from the court's statement that "if claim two * * * is valid, the defendants' devices are infringements thereof." The sole question was, therefore, as to the validity of the patent or patents. The invention in controversy was a dust separator, or collector as it is technically termed, while the devices urged as anticipations thereof were steam separators. The patents of Morse were for devices for separating dust from atmosphere, while the references were for separating steam from the residue or the product of its condensation. The theory or principle of the invention was dependent upon the centrifugal influence attending the whirling dust and air, which, owing to the greater specific gravity of the dust, threw the latter towards the sides of the receptacle and permitted it to escape through an opening provided therefor, while the pure air, affected to but a slight degree, escaped by way of an opening in axial coincidence with the receptacle. The steam separators were not originally adapted to separating dust and air; but by some modifications might have answered this purpose, and might have been substantially the same as the Morse device. The court held, however, that this did not constitute anticipation, and that where the novelty of the invention resides in the particular form adopted, it is not negated by prior structures in another art, and which are not capable of doing its work, though afterwards, in the light of that invention, they can be modified to perform its function.

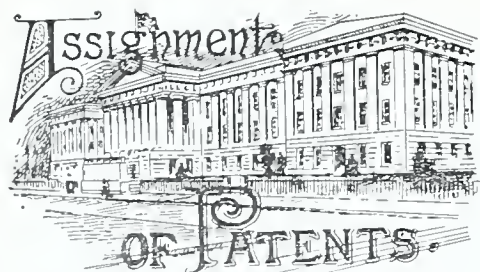
DURHAM VS. DENNISON MANUFACTURING COMPANY.

This was a bill in equity for the infringement of two patents: one a reissue dated June 10, 1884, of a patent dated May 8, 1883, for a combined tag and envelope, and the other an original patent dated November 24, 1885, for an improved envelope. The case came to the Supreme Court on appeal from the Circuit Court of the United States for the Southern District of New York. The original patent was summarily disposed of by declaring non-infringement as a question of fact. On the other hand, the treatment of the reissue involved a question of law, the settlement of which resulted in a declaration of the invalidity of the patent.

FORGIE VS. OIL WELL SUPPLY CO.

This is a case coming before the U. S. Circuit Court of Appeals, Third Circuit, on appeal from Circuit Court United States for the Western District of Pennsylvania, and one in which Forgie, the complainant below, sued the Well Supply Co. for infringement of letters patent No. 422,879 granted to him for an improvement in oil well wrenches. The court held that Forgie's patent was invalid. The rule of law upon which this decision is based is, that of two persons interested the one who actually makes the complete invention is entitled to the patent. It is not sufficient that one suggest the ends and the means by which it can probably be attained, for this does not constitute invention; it is the means for attaining the end which form the invention, and the producer thereof alone is entitled to the patent. The application of this rule to the facts of the case is easy, and results in the decision reached by the court. This case is reported in vol. 67, O. G., page 1573.

RECENT experiments in glass making, in Germany, have resulted in combination of ingredients which will make glass that will transmit light, but only a small per cent of heat. This glass will be especially valuable for gas and lamp shades, and for electric lights.



Under this heading is published all assignments of patents or partial interest in same, as on record in the United States Patent Office for the month ending May 28, where the consideration was \$2,000 and over.

John Blue inventor, to John M. McCormick of Laurinburg, N. C. Stalk Cutter. Exclusive to make, use and vend throughout the U. S., except North and South Carolina. \$10,000.

Wm. L. Butts inventor, to the Standard Range Co., of Evansville, Ind. Stove or Range. All rights for U. S. \$3,000.

Thomas Brett inventor, the Brett Piano Co., assignors to L. E. Morgan and others of Geneva, Ohio. All rights. \$5,000.

Wm. L. Butts inventor, to the Standard Range Co., of Evansville, Ind. Water Fire Pot. All rights. \$3,000.

Claude W. Bennett and Franklin Chapman inventors, to Claude W. Bennett of Penn, Mich. Wire Fence. All rights. \$15,000.

Wm. H. Betts inventor, Model Mop Pail and Wringer Co., assignors, to J. A. White of Chicago, Mo. Wringers. All rights. \$2,000.

Herman L. Boyle inventor, to Dan J. Leathers, Grand Rapids, Mich. Pneumatic Tires for Wheeled Vehicles. An undivided half interest. \$2,000.

Ambrose S. Baker inventor, to Emma L. Hooker, Vermillion, South Dakota. Composition of Matter for Bricks. All rights. \$2,500.

C. S. English inventor, to Jnde C. English, Lowell, Mich. Electrical Governors for Water Wheels. One fourth of his right. \$5,000.

A. G. Evans inventor, to the National Switch and Signal Co., Easton, Pa. Bearings for Signal and Switch Rods. All rights. \$2,500.

Geo. H. Spencer inventor, to Henry A. Mugler of Chicago, Ill. Grapples. All rights. \$2,000.

Zachary M. Lindley inventor, Thomas A. Royer assignor, to S. O. Salisbury and J. E. Campbell of Rapillon, Neb. Washing Machine. All rights. \$2,000.

L. L. Loomis inventor, to M. L. Ballou. Invalid Beds. One fourth interest in said invention. \$2,000.

James Lepley inventor, to Wm. L. Showers, Lewisburg, Pa. Buggy Wrenches. An undivided half of his interest. \$2,500.

Horace C. Lyman inventor, to the Lyman Wind Mill and Power Co. Wind Mills. All rights. \$26,000.

Wm. S. Laney inventor, to J. F. Rainer. Washing Machine. All rights for 15 states. \$15,000.

John A. E. Anderson inventor, to Wm. C. and Thos. Kern of Lebanon, Ind. Fence. All rights. \$2,000.

Matthew F. Connett, Jr., inventor, the Tennessee Fence Co., assignors, to C. F. Dillo of Troy, Ohio. Fence Machine. All rights for the states, Pennsylvania, Ohio and Indiana. \$5,500.

James K. Cummings inventor, to C. R. Lynn and C. F. Worley. Coffee Pot. All rights for Ohio and Kentucky. \$3,000.

Emil Dewerth inventor, to John Hagerdorn of Detroit, Mich. Dough Cutting Machine. All rights. \$2,000.

Asa B. Frame inventor, to the A. B. Frame Water Wheel Co., of Muscatine, Iowa. Water Wheel. All rights. \$60,000.

Edward A. Franklin inventor, Texas Invention Co., assignors, J. A. Brown of Austin, Texas. Siphon Pumps for Oil Cans. All rights. \$2,500.

Otis F. Goodwin inventor, to Alexander Mack of Preaski Co., Ga. Roller Cotton Gin. One undivided half of all his rights. \$2,500.

Josiah C. Gooding inventor, to Anna Reed and others. Design Desk and Seat. All rights for the State of Indiana. \$15,000.

Joseph W. Henry inventor, to J. B. Scott of Burton, Mo. Seed Cleaners. All rights for the States of Illinois and Kansas. \$5,000.

Thomas J. Hatfield inventor, J. C. Benson assignor, to W. H. Howard and others of Hamilton Co., Iowa. Fanning Mills and Grain Cleaners. All rights for Minnesota and North Dakota. \$2,400.

August Mayer inventor, to S. W. Miller of Chicago, Ill. Automatic Flush Tanks. All his rights. \$2,500.

Daniel D. Merrill, Jr., inventor, to the Tarella Pen Co., of West Virginia. Trade Mark for Metallic Pens. Exclusive right to manufacture and sell. \$16,000.

G. de C. O'Grady and J. R. Collins inventors, to C. H. Trego of Chicago, Ill. Coin Holders. Exclusive right to manufacture and sell. \$8,000.

Robert E. Poindexter inventor, Robert R. Irving assignor, to John W. Mitchell of Indianapolis, Ind. Fence Post Bases. All rights. \$2,700.

Wm. R. Park inventor, Park Manufacturing Co., assignors, to Thos. H. Ellis of Whitman, Mass. Jet apparatus. All rights. \$15,000.

Geo. F. Ranson inventor, to the American Watchman's Time Detecting Co., of Ohio. Watchman's Time Detectors. Exclusive right. \$70,000.

Horace L. Freeman inventor, Baxter Shemwell assignor, to J. C. Carpenter of Clifton Forge, Va. Furniture Tightening Device. An

undivided five-twelfths of his rights for the U. S., except 22 counties in Tennessee, 10 counties in Texas and seven states. \$32,000.

Seth D. Tripp inventor, to the Tripp Fruit Wrapping Machine Co., of West Virginia. Wrapping Machine. All rights. 249,500.

James W. Woodward inventor, to L. A. Walsworth of Harvey, Ill. Ice Cream Freezer. All rights for the State of Michigan. \$4,000.

Columbus E. Wilson inventor, Amos Duffy assignor, to Frank H. Conaway Wood Co., Ohio. Fences. All rights for 28 counties in Ohio. \$2,000.

Lee Yancey inventor, to Geo. A. Baker and Truman Barker. Attachment for Adjusting Window Shades or Curtains. All rights for 30 Counties in New York. \$3,000.

Electric Flashes.

Work on the Chicago and St. Louis electric railway is now well under way.

The Gray Telautograph Exchange in Lexington, Ky., is pronounced a success.

Mr. Nikola Tesla has had the degree of L. L. D., conferred upon him by Columbia College.

Electrical Review observes that God certainly should bless the man who first conceived the electric fan.

The net profits of the Montreal Street Railway Company for the six winter months ending March 31 are given at \$59,000.

Electric wagons with pneumatic tires are destined to take the place of horse vehicles of the present day in large cities.

A bill to allow cities to furnish electric current for heating has been passed by the Massachusetts House of Representatives.

The National School of Electricity has been organized in Chicago, with Thos. A. Edison as dean. The president of the school is J. P. Barrett.

Lizzie Halliday, a murderess, and the first woman to be condemned to the electric chair, will be electrocuted at the Auburn, N. Y., prison during the week beginning August 6.

A bicycle railway is projected between Springfield and Holyoke. Routes between the two places have been carefully viewed and property owners have been seen about the scheme.

The authorities of St. Petersburg, Russia, have notified United States inventors that the tramway lines of that city are to be equipped with the best street railway motors that can be obtained.

Boston city authorities have ordered the West End Street Railway Company to remove all overhead wires. Telegraph and telephone companies have also been ordered to place their wires underground.

C. C. Wood and Chas. Berg, of Moorhead, Minn., have invented an incandescent electric motor, which they call the "Ring" motor. It is 12 inches in diameter by 5 in depth, which is enclosed in an air tight glass covered case.

The experiment of carrying U. S. mails on the trolley cars of Brooklyn, is to be tried. The Atlantic avenue line will be used. A closed trolley car, painted white, and marked "U. S. mail," for distribution along the line, will be run from the 36th street station to Coney Island.

A Chinese engineer, educated in New Haven, Conn., is about completing a telegraph line, 3,000 miles long, across the Gobi desert, from Peking to Kashgar, Chinese Turkestan. It has been three years under construction, and poles in places were hauled 600 miles. Branch lines connect it with the Russian system.

It is probably not widely known says *Electrical Review*, that only 7 out of the 17 transatlantic cables are in use—10 having given out from various causes. Estimating the cost of each cable at \$3,000,000, here is an irreclaimable investment of \$30,000,000 safely buried beneath the ocean to a depth ranging from a few fathoms to over five miles.

Col. Cody in the June *Cosmopolitan* Advance, the theory that the noticeable change in the climatic condition of the western prairies, is due largely to the building of wire fences and telegraph lines, that attract electrical currents, and that this especially accounts for the dew, an almost unknown condition on the great plains until within the last few years.

In the Massachusetts Legislature a substitute for the bill to incorporate the Boston, Somerville & Lowell Street Railway Company providing for the incorporation by E. Moody Boynton and others of the Boston & Lowell Bicycle Company, capital \$3,000,000, to construct and operate an elevated and surface road under Boynton patents between Boston and Lowell was passed.

The electric headlight is making its way in railroad service. Where already in use it is a demonstrated economical and practical success. The old oil headlight has its limits and its disadvantages. The electric headlight throws its rays from half to three-quarters of a mile in front of the locomotive. Obstructions on the road are plainly visible at that distance, some engineers asserting that a switch disk can be more readily made out by such a light at night than in the day time.

Bay Ridge.

This is the name of a beautiful spot on the Chesapeake Bay, which is reached by the Baltimore & Ohio Railroad. Arundel-on-the-Bay is the name of another summer resort—a shady prominence three miles south of Bay Ridge, and connected therewith by an independent railroad. These resorts are popular with Washingtonians because of their accessibility and the opening of the season was inaugurated last month with an excursion from this city in which a number of newspaper men were treated right royally by Mr. S. B. Hege, district passenger agent for the B. & O. The facilities for bathing at Bay Ridge are excellent, the cafe and hotels are commodious and the management and all the surroundings are in keeping with a first-class resort.

Industrial Notes.

A \$1,000,000 smelting plant is to be built at Perth Amboy, N. J.

A fire in Dubuque, Ia., last month destroyed 22,000,000 feet of lumber.

The Page Tube Works, of Warren, O., have obtained fuel and have resumed with 350 men.

The Missouri Court of Appeals has decided that a cable road in front of one's premises is not a nuisance.

"Come off," is the ingenious trade mark adopted by John C. Proctor of Rochester, N. Y., for a corn remedy.

The North River Bridge Bill has finally received the signature of the President, after passing both branches of Congress.

During last month's coal famine, corn was mixed with coal for fuel in Sioux City manufacturing and the experiment was a success.

A company with a capital of \$500,000 will be organized at Bessemer, Ala., for the purpose of erecting and operating a large steel plant at that place.

An order for 30 passenger locomotives for the Central Railroad of Brazil has been placed with the Brooks Locomotive Works of Dunkirk, N. Y. The order amounts to nearly \$750,000.

A patent has been granted in Auckland, New Zealand, for a net to catch whales. The mesh is big enough for a calf to pass through, and it is said to have been used already with great success.

Reading, (Pa.), capitalists have commenced operating the graphite mines at Pughtown, West Chester County, Pa., which were discovered and worked satisfactorily many years ago, but have been since abandoned.

The Canadian Pacific railway company is considering the feasibility of utilizing the vast water power along its Rocky Mountain division for the purpose of generating electricity to run the trains over the mountains.

The bill incorporating the Massachusetts Ship Canal Company with a capital stock of \$7,500,000 has passed the Massachusetts House of Representatives. It is proposed to construct a canal across Cape Cod from Nantucket Sound to Cape Cod Bay.

One of the most important inventions in the way of farm machinery is that of J. W. Spangler of York, Pa., a machine for distributing paris green. The machine has the appearance of a corn cultivator, the hoppers being so justified as to distribute the paris green on two rows of potatoes at once.

An acre of land was carefully measured in Chehalis county, Wash., by a timber cruiser, and found to contain fourteen fir trees, the smallest of which was 6 feet diameter and the largest 10 feet. The average distance to the first limb was 150 feet and one tree was 300 feet long. That acre would yield more than 500,000 feet of lumber.

Hon. Chauncey M. Dupew, in his speech at University of Virginia, June 11th said: Our country is still comparatively unsettled, our resources are only partially developed, and our possibilities for industry, for happiness and for homes are incalculable. The Southern States offer almost boundless opportunities of agricultural and mineral wealth.

A Massillon, O., dispatch says: The J. H. & D. Lake Co., manufacturers of friction clutch pulleys, were closed by the sheriff Friday, June 15. Proceedings in foreclosure were instituted by W. W. Fish, trustee, of Elmira, N. Y., to secure a mortgage of \$15,000, and other obligations will run the total up to \$30,000. An effort backed by the Board of Trade, is being made to effect a reorganization and continue the business.

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THE INVENTIVE AGE has made arrangements whereby it can furnish the complete set of World's Fair views—220 in all—at a nominal figure. These views are not cheap wood cuts but fine half-tone cuts covering every important feature of the greatest of the world's expositions. THE INVENTIVE AGE one year, and this set of views will be sent to any address, postage paid for \$1.35.

Still another great offer is that of the People's Atlas of the world—maps and statistics corrected up to 1884—124 pages—maps of every state and every nation—a complete Atlas, with over 300 illustrations, usual price \$3 to \$5. We will furnish THE INVENTIVE AGE one year and send the Atlas to any address, postage paid for \$1.35. Reliable agents wanted in every county in the United States. Send for terms to THE INVENTIVE AGE, Washington, D. C.

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1890—Nos. 25, 27, 28, 29, 30, 31, 32, 33, 36, 37, 38, 40, 41, 43, 44, 45, 47, 48, and 50.
1891—Nos. 51, 52, 54, 55, 59, 64, 72, 73, 76.
1892—Nos. 67, 78, 81, 88, 94.
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LIST OF PATENTS

GRANTED FOR INVENTIONS,

MAY 29th, 1894.

[See note at head of this list.]

Acid proof composition. J A Just.
Advertising wagon. J N Russell.
Air compressor. J Birner and H Messing.
Alumina, making porous sulfate of. J Enquist.
Arm rest for writing purposes, movable. J W. Shea.
Asphalt heating and mixing machine. R Butcher.
Auge, hollow. J Yam.
Awning attachment. R. Bowles.
Ax. J P Kelly.
Axle lubricator. G W Pero.
Ballot box, registering. L M Foster.
Banjo mute. H E Le Valley.
Barrel by recoil of first, inertia piece releasing second. A Burgess.
Bars or rods, machine for drawing. P M Haas and C S Dutton.
Battery element, secondary. S A Rosenthal and V C Doubleday.
Bearings, dust guard for pedal. H M Pope.
Bed, invalid. J B Seearce.
Bed joint, folding. C Bostad.
Bed, sofa. A F Conant.
Bedstead. W Goodliffe.
Belt tightener. C C Stuart.
Berth raising or lowering mechanism. G H Poor.
Bicycle. W A Courtland.
Billiard games, apparatus for one ball. G Gschwendtner.
Boiler and furnace. R Muller.
Boiler front angle plate. G Fox.
Book holder. A A Anbler.
Book stapling machine. E T Greenfield.
Boot or shoe nailing machine. F D Locke.
Bonquet holder. A Mente.
Box pile. A H Moore.
Bracket. W D Gridley.
Braiding machine spool holder. W Mundt.
Branding iron. J L Torrey.
Brick presses, sectional mold for. P L Simpson.
Broom, corn. J L Stevenson.
Broom corn, machine for removing stems from. P Lamboy.
Brush. A E Magoris.
Brush, cleansing. G W Park.
Brush, tooth. O F Hager.
Buckle. C A Conger.
Buff wheel. W T Heylman.
Buffing wheel. T J Cleary.
Building, fireproof. M F McCarthy.
Butter, preserving or renovating. W N Blakeman, Jr.
Button. C E Stowe.
Button riveting machine. F A Ryno.
Calipers, watchmaker's. A F Brockway.
Cambering machine. H C Ryding.
Camera shutter. W J McCollom.
Caulfilling machine. J W Kales.
Cane transferring device, sugar. C D Armstrong.
Car buffer. 3. W F Richards.
Car coupling. E W Kelley.
Car coupling. W S Miller.
Car fender, railway. J W Madden.
Car lighting or heating system. C R Arnold.
Car standard. A Johnson.
Carpet stretcher. W Hoyer.
Carriage. W M Ward.
Carriage, baby. O Thielemann.
Carriage top. J P Johnson.
Cash register and indicator. L Ehrlich.
Cattle guard, electric. D H Wilson.
Chuck, drill grinding machine. J S Bancroft.
Churn. J P Bolding.
Churn. G W Crabb.
Churn attachment. J M Hughes.
Cigar lighter, electric. D Misch.
Cigar tip cutter. A P Thompson.
Cigarette making machine. H F M Le-maire.
Circuit closer. G W Hey.
Clip. F C Atherton.
Clock case. A Kanatnye.
Clock, electrically illuminated. D Misch.
Clock striking mechanism, electric. C D Warner.
Cloth cutting machine. P Howe.
Clothes drier. E S Sutton.
Clutch. E L Jones.
Clutch. M F McMahon and T F Carver.
Clutch, rope. D W Orcutt.
Coal separator. W H Herring.
Cock box, stop. T J Ryan.
Coin discharging and delivering device. P G Wagner.
Collar, horse. P K Coover.
Comb cleaner. H Fisher.
Comb cleaner. G W Richardson.
Cooking device, steam. G Yinger.
Cork compressor. S Wile and H La Casse.
Cork cutting machine. F C Truslow.
Cork feeder. S Wile and H La Casse.
Cork shell cutting machine. A L Mitchell.
Crane, charging. T R Sr., and W H Morgan.
Crib, folding. S C Neal.
Cuff blank turning machine. G E Norris.
Cuff holder. W W Anderson.
Current motor, alternating. W Stanley, Jr.
Curtain rod, adjustable. W A Turner.
Curtains, &c., adjustable rack for stretching lace. C L Kuehn.
Cut off, rain water. W C Hilliker.
Cutter heads, power attachment for side. C C Stuart.
Cycle driving mechanism. F L Eager.
Damper. W E Patchin.
Dating and stamp canceling machine. J J B McElrath.

Derrick, floating. T T H Harwood.
Desk and seat, school. A J Palmberg.
Desk support and hinge, combined. F W Tobey.
Disinfecting apparatus. R A Rosenblatt.
Distilling water, method of and apparatus for. H F Hodges and D J Havenstrite.
Door check. T Carley.
Door lock, sliding. A Dillenback.
Dress goods rack. R C Parsons.
Eggs, compound for and method of preserving. F M Underwood.
Electric battery. S H Hoggson.
Electric motors, operating. J S Bancroft.
Electrode, therapeutic. W B Farrar.
Elevator. J H Clark.
Elevator. W H McCoy.
Engine steering gear, fraction. G W Kramer.
Evaporating apparatus. A P Leist.
Excelsior machine. T M Shank.
Eyelet. E L Pypke.
Fats from animal or vegetable substances, extracting. A Schweizer.
Feed rolls, device for weighting. C C Stuart.
Fence machine, wire and picket. G E Simmons.
Fence post. E J McCullough.
Fence wire, machine for stretching or removing. W M Barger.
Filling device, automatic. A E Briggs.
Fire alarm apparatus. F J Thunhorst.
Firearm, recoil operated. A Burgess.
Fire pail. F B Gomis.
Fireproof structure. M F McCarthy.
Fish line reel. C B Corbin.
Fish line reel. S H McGregor.
Floor, ceiling, &c., fire proof. M F McCarthy.
Floors, &c., construction of fireproof. M F McCarthy.
Fly paper, sticky. O and W Thum.
Food for horses, preparing. H B Kaiserstein.
Food products from cereals, machine for the manufacture of. H D Perky.
Furnace. J W Wilkinson.
Furnace door. L Duffner.
Furnaces, wind jacket for blast. L B Walker and J Murphy.
Garment fastener. E S Smith.
Gas burner. H Epprecht.
Gas furnace. G Axdorfer.
Gas making apparatus. W A Koneman.
Gas service pipes, condenser and drip for. A H Gindale.
Gate. J H Morris.
Gate. J B Van Nada.
Gear, reversing. G W King.
Grain binder. A Stark.
Grain binder tension device. J Whitcomb and A Wotring.
Grain cleaner. C J Mober.
Grain meter. H P Dennis.
Grain separator. J H Creter.
Grave or lot markers, machine for making. M B and F J Mishler.
Grinding machine. E B Benham and H E Barlow.
Gun, recoil operated magazine. A Burgess.
Hame link. J Stanley.
Hat fastener. J J Riordan, Jr.
Hat rack. C E Cochrane.
Hay rake and loader. J T Bell and A T Stewart.
Head rest. A Schwaab, Jr.
Heater and table. E M Burchard.
Heaters, cast iron conduit for steam or hot water. C J Balthasar.
Heating apparatus, hot water. A T Henderson.
Heel. A P Gotham.
Hinge. J J Berry.
Hitching device, horse. J W McHenry.
Hoisting machine. L Hamerly.
Hollback. W Rice.
Hook. J M Reid.
Horseshoes, nailless. G Burgstaller.
Humidifying fibrous substances, means and apparatus for. J T Pearson.
Insulator. C E Conover.
Insulator. H H Luscumb.
Insulator. L McCarthy.
Iron, apparatus for breaking pig. J S Kennedy.
Kiln. F Halbeisen.
Kitchen cabinet. M S Thomas.
Knitting machine. L E Salisbury.
Knob attachment. T E Wardwell.
Lamp shade. F E Knight and H S Smith.
Lamps, oil regulator for continuously fed. H S Pullman.
Lantern, bicycle signal 2. F Rhind.
Leather scoring machine. J R Scott.
Legged articles, construction of. W J Humphreys.
Liquid distributor, automatic. P Leon.
Locomotive attachment. J R Rutherford.
Loom for weaving bordered fabrics. S Goss and W Varley.
Loom lease rods. A Minney.
Loom let off mechanism. J H Mayer.
Matrix drying apparatus. R H Healey.
Measuring machine, cloth. J H Vandenburg.
Mechanical movement. S F Alberger.
Milling machine. V W Mason, Jr.
Mirror adjusting device. F W Tobey and D W Tower.
Mousing hook, self. C H Biggs.
Mowing machine. J H Jones.
Mud and oil trap and water purifier. G F Day and W Hunter.
Net frame, landing. G Kamp.
Nipple wrench. A Dudley.
Nut lock. J J Bentley.
Nut lock. H J Van Nest.
Oil can. C S Upton.
Oil or oils with another material, &c., mechanically compounding. J F Newell.
Orange sorting machine. E S Manly.
Ore roaster. O W Davis, Jr.
Packing for rock drill pistons. H M Osborn.
Paper bags, making. E E Claussen.
Patron tracing and cutting machine. C E Reed.
Pen fender. B F Smith.
Pencil sharpener and eraser, combined. H Fisher.
Photography, reproducing objects in relief or intaglio by the aid of. M Russo.
Pianoforte action. T Cahill.
Piano stringing machine. F W Hedgeland.
Picture hanging device. H Redmond.
Pins, bolts and rivets, tool for making. P J Conroy.
Pipe coupling. A Bryant.
Pipe wrench, chain. N R Streeter and C P Mosher.
Pistol, magazine. P Blachon and E Minard.
Placer machine, dry. T L Walsley and H H Wright.
Planing machine, adjustable bearing for upper feed rolls of. J R Thomas.
Planter, corn. B F Darby.
Planter, hand. J Chadwell.
Plow, wheeled. J H Jones.
Pneumatic tired wheel. W Turner.
Pneumatic transmitter or store service. C O Yale and J H Ames.
Pocket book holder. F Halzhaner.
Pocket books, &c., corner or frame for. L B Prabar.
Polishing or buffing wheel. T J Cleary.
Propeller. O B Genty.
Pulping and grinding machine. G Hibbert.
Pulverizer and planter, combined. E S Howell.
Pump, hydraulic air. E H Weatherhead.
Pump motor, electric. J F Blake.
Pump rods, grip for polished. M Turton.
Railway, cable. C W Hunt.
Railway chair. A F Naylor.
Railway danger signal, pyrotechnic. F A Fox and A P Yates.
Railway fog signal apparatus. J G Dixon.
Railway rail chairs, making. A J Moxham.
Railway rail joint. M Hall and W H Baker.
Railway safety system. W H Elkins.
Railway signal, electric 2. C Schlen and H V Riley.
Railway track structure. J H White.
Railway train gate. J Wayland.
Railway trolley, conduit. W Lawrence.
Railway turntable, electric. R M Hunter.
Rakes and loaders with wagons, device for connecting hay. M Mann.
Refrigerator. L B McClanathan.
Refrigerator car. C S Miller and J E Du Bois.
Revoluble screen. D E Phillips.
Revolver lock mechanism. D B Wesson.
Rock drill. J H Smith.
Rotary engine. A R Benn.
Sad iron. M V Trube.
Sash fastener. F Burmeister.
Saw, drag. J A Geselins.
Scrip. J W Jones.
Searl pin. C C Partridge.
Scraper, road 2. M G Bunnell.
Screw driver. J J Edwards.
Sear, safety. G A Horne.
Sennaphore. J W Davis.
Sewing machine. J Reece.
Sewing machine shuttle actuating mechanism. H Moore.
Shade bracket, window. T H Klein and H C French.
Shaft support, vehicle. J J Barker.
Shaping fleecy masses, machine for. E Goldman.
Shingle marker. C Guyer.
Shoe, inside. J H Fos.
Shoestring fastener. S E Blake.
Shutter bower. H Zimmerman.
Smelting and refining apparatus, copper. J C Bull.
Smoking cloth, clasp for. F S Pinkham.
Smoke consumer. F S Sejnoba.
Smoking apparatus, mouthpiece and stem for. W O'Brien.
Soldering caps on cans, machine for. M J Hawkins.
Soldering tool. D G Orr and C E Thomas.
Spinning frame tension device. R Atherton.
Spool making machine. J F Wardle.
Sprinklers, sprinkling head for street. W H Miller.
Stamps, labels, &c., apparatus for affixing. E C Phillips.
Stand, table, or analogous article. S H Hoggson.
Stapling machine. E T Greenfield.
Starching machine. A Conkling.
Stay, dress. F W Lyon.
Steam boiler. W Saur.
Steam boiler, radial tube. E S T Kennedy.
Steam engine. J L Gourley.
Steam engine. B F Sparr.
Steam separator. C J Mellin.
Stone or cement composition, artificial. C A Shank.
Stove and lamp, oil. J F Place.
Stove for drying matrices. F Schreiner.
Stove, Gas. C S Upton.
Stove hearth and ash box, combined. E L Flood.
Stove, lamp. C S Upton.
Stove, oil. J F Place.
Stove, oil cook. C H Boeck.
Stove, vapor heating. B S Koll.
Surgical chair, adjustable. T J Shackelford and J F Miltonberger.
Suspender cast off. C Bloomberg.
Switch. H P Ball.
Switchboards, testing system for multiple. C E Scribner.
Table for draftsman, &c. J W Bramwell.
Tables, blinds, desks, &c., flexible cover for. C S Homer.
Tag, marking. S Rancyer.

Talking beard. M Schirman.
Telephone, magneto. A F Beardman.
Telephone speaking attachment. W Weber.
Thrashing machine concave and feed board. D W Broach.
Tinning machine. J Hirschmann.
Tire, pneumatic. R Hoffman.
Tire, pneumatic. J H Piete and A J Dickson.
Tobacco, cooling channel for ordering. S P Mayo.
Tobacco pipe. O M Jonasson.
Tongue switch. A J Moxham.
Transplanter. D Dand F H Bemis.
Trolley wire support. B J Jones.
Trolling spoon. J R Harlow.
Trunk. F Lyford.
Type, device for removing leads from. W Weatherby.
Type writing machine. G B Webb.
Unicycle. R Hendrich.
Vamps to uppers, machine for pasting. H Fischer.
Vehicle spring and axle attachment. W Beckert.
Vessel, screw propelled. C G Lundberg.
Voting machine. J McTammany.
Wagon, dumping. W S Phillips.
Wash boiler. D J H Davis.
Washing machine. E C Brewer.
Watch jewels, mechanism for loading. G E Hunter.
Watch, stem winding and setting. D H Church.
Watches, plate for stem winding. W W Hastings.
Water closet flushing tank. H W Kirchner and W A Spears.
Weather board gage. T L Wint.
Weather board gage and adjuster. S H Abshier and G F Lacke.
Wheel guard, hand. J W Cameron.
Whistle, steam chime. H R Frisbie.
Winding cotton web, &c., machine for. E Goldman.
Window, door, or the like, horizontally sliding. C Summerrmann.
Wire machine, barb. S Swannam.
Wire twisting machine. R Sedgwick.
Wood, vulcanizing. C Howard.
Wood, vulcanizing and drying. C Howard.
Wrench. T E Chatten.
Wrench. H Krebs.
Wrench. K A Klase.
Zither, guitar. F Menzenhaner.

PATENTS GRANTED JUNE 5, '94.

Acid by means of heated gases, apparatus for concentrating sulfuric. J L Kessler.
Advertising apparatus. A Berliner.
Amalgamating machine, gold. P E Gallron.
Amalgamator. G Delage.
Anemeter. E R Knowles.
Animal trap. C J Roberts and J W Owen.
Annunciator. T J Thompson.
Annunciator, electrical. F W Ross.
Apparatus for supporting children. J Krant.
Apparatus for dynamo electric machines. H F T Erlan.
Autographic register. H C Biette.
Axle box. T G Van Wyck.
Axle, sulky plow. W B Morris.
Bails, machine for forming wire. H S Reynolds.
Bailing press. A E Anderson.
Bailing press. H R Jerigan.
Band cutter. W J Hopper.
Barrel head. W C Blundell.
Basket, fruit. C Van Der Zee.
Bed, folding. J P Hayes.
Bell, non winding door. W A Barnes.
Bicycle. E D King.
Bicycle. C R Mayne.
Bicycle, aquatic. J E Ronk.
Bicycle attachment. M E Blood.
Billiard counter. W S Hannaford.
Boat. C C Heimblangh.
Boiler in vertical sections. J J Hogan.
Boiler steam dome. J J Hogan.
Bolt clippers. H K Porter.
Bolt head and nut finishing machine. C E Roberts.
Book or paper hanger. S F Milliron.
Bottles, &c., antifilling device for. E S Reed and A J Stoops.
Bottles, jars, &c., device for closing. A Lasch.
Box blocking machine. J Hauale.
Braiding machine. J Bruck.
Brake shoe. C T Schoen.
Brick tiles, &c., making enameled. A M Strusholm.
Broom heads, means for attaching handles to. S Green.
Brush, horse. H L Barney.
Buckle, suspender. D L Durand.
Burglar alarm. N Handet.
Butter extractor, centrifugal. A Ponten.
Butter mold. F W Eggeling.
Button. J V Pilcher.
Button. C Radcliffe.
Button drilling machine. G Carlyle.
Button machine. G Carlyle.
Button parts, mechanism for assembling. I G Platt.
Camera. T M Clark.
Can for paint, putty, lard, &c. M A Marzynski.
Car brake. G W Carter.
Car brake. J Mayer.
Car chair, reversible. P Little.
Car coupling. G W Bartfield.
Car coupling. D Boyer.
Car coupling. E D Brouner.
Car coupling. G Ker.
Car coupling. C A Tower.
Car fender, railway. J E McBride.
Car, freight. J J McClimont and P Marron.
Car roof. C M Jennings.
Car seat. P Little.
Cats, lumber jack for railway. C D Clarke.

Cash register and indicator. W Lamm.
Cellulose, plastic compound of. C F Cross.
Ed Bevan and C Beadle.
Chain, drive. J Appleby.
Chalking device, line. S B Miller.
Checkrein support. J Carter.
Cherry steamer. J W Brown, Jr.
Chuck, engraver's. H Gruner.
Chuck, engraver's. F Mink.
Chute, coal. J Sully.
Cigar launching machine. F J Hagen.
Cigar package. S Phillips.
Cigarette wrapper holder. J R Hernandez.
Clutch. J C Steinhorn.
Clock case. E P Baird.
Clock, electric alarm. J S Whitehead.
Clod crusher and pulverizer. H J Nelson and N M Neilsen.
Cloth cutting machine. N Rubenstein.
Clothes pin. T J Gordon.
Clutch. M Campbell.
Clutch. T J Thorp.
Coin controlled mechanism. H A Manley.
Collar and cuff case, traveler's combined. J D Dozier. (Reissne).
Collar or cuff. R M Hunter.
Collars, device for shaping folds of linen. A C Vail.
Concentrator. A H Rappe.
Cooler. W Linter.
Cornstalk shocking mechanism. J W Ugle.
Cotton chopper. G W Murray.
Cotton opener and stopping mechanism therefor. W Richardson and J Fidler.
Curling iron 2. C F Snyder.
Current motor, alternating. C Offredi.
Current motor, multiphase. L Bell.
Current motors, method of and means for starting alternating. L Bell.
Currents, economizing the energy of alternating. C F Scott.
Cuspidor, invalid's. J S Ross.
Decorticating ramie, &c., machine for. P A Favier.
Dental chair 2. A W Browne.
Dental engine. R G Stanbrough.
Dental engines, electric motor for. W A Crowlins.
Direct acting engine. P Chouteau.
Dish cleaner. C Pdmleaf.
Display box. N Schroder.
Displaying chains, tray for. W Stiefelagen.
Door fastener. G F McComb.
Dough cutting machine. E Dewerth.
Dry kiln for pottery. J C Titts.
Dust pan. J Reniker.
Dye, substantive blue. H A Bernthsen and P Julius.
Dye, substantive violet. H A Bernthsen and P Julius.
Ear protector. C Jung.
Eaves trough. T C Keller.
Electric circuit regulator. H F Waite.
Electric circuits, stand for controlling. E R Knowles and E H Park.
Electric elevator. W D Lutz.
Electric machine, dynamo. A B Herrick.
Electric machines, system of circuit control for. C E Davis.
Electric machinery, dynamo. C Sellers.
Electric meter. W B Reel.
Electric meter. E Thomson.
Electric motor. A Humman.
Electric motor controller. W J Hopkins and T Stebbins.
Electric power stations, means for preventing arcing in. E Thomson.
Electric reciprocating motor. E Thomson.
Electric subway. J J E Phillips.
Electric switch box. E R Knowles.
Electric wire connection. J Y DeMott.
Electrical distribution by alternating currents, system of. C F Scott.
Electrical distribution, system of. B G Lamme.
Electrotype block. W T Barnum.
Elevator. R W Hare.
Elevator door operating device. H Rowntree.
Elevator safety device. G E Dow.
End gate rods, die for making wagon. T W Smith and J G Price.
Excavating machine. R Dalton.
Explosive and making same. W Evelyn Luardet.
Fan, ventilating. H Hobbs.
Fare register. F C Boyd and C E Gurdig.
Fancet, can. G W Ranker.
Fence post. C Gros and J F Thomas.
Fertilizer distributor. G W Murray.
Fish trap. W Seaton.
Flagstaff coupling. H Wettstein and C Rodmann.
Fruit carrier. T S Pith.
Frying frame, culinary. C G Foland.
Furnace, self feeding smokeless. G Gulickson.
Fuse box. A Ekstrom.
Fuse, safety precession. H C Seddon.
Gas lighting and extinguishing apparatus, automatic. N H and A B Shaw.
Gear, elastic. C A Lieb.
Gear finishing machine. J L Knuz.
Gearing, multiple. W H Bright.
Gin saw filing machine. R S Mudford.
Glass melting furnace. M Seiberling.
Glass working apparatus. H D Burnett and S E Doane.
Grain drill. A Carpenter.
Guns, shifting mechanism for cocking arms of breakdown. F A Hollenbeck.
Guns, trigger for double barreled. W Fleming.
Hair crimping iron. R Nicol, Jr.
Harp. A J Gery and R Dodge.
Harvester, corn. N M Teuney and G W Harrison.
Harvesting machine, corn. C K Connor.
Hatchway, automatic. J M Elder.
Hay stacker. H L Short.
Heat regulator. J F McElroy.
Heating apparatus. E E Ashley.
Heating apparatus, electric. G D Burton.

Heating apparatus steam. E Watts.
Heating system for cars, &c. J W Beach.
Heel breast finisher. N Churchill and W C Baxter.
Hoisting and conveying apparatus. T S Mitter.
Hose coupling. J M Cox.
Hub, antifriction wheel. E F Moore.
Hydrocarbon motor. E I Nichols.
Ice cream freezer. J B Butler.
Ingot charging apparatus. T R, Sr. and W H Morgan.
Ingot mold. J Hingworth.
Insulator, feed wire. C A Lieb.
Insulator, section. H B Nichols and F H Lincoln.
Key instruments, sound recording and reproducing attachment for. C W Nystrom.
Knitting machine. L N D Williams.
Knitting machine. W H Zeller.
Knitting machines, self acting fashioning device for circular. E C Breithwaite and J W Hefworth.
Lamp, electric arc. L E Howard.
Lamp, electric arc. L B Marks and C Ransom.
Lamp, incandescent. D C Voss.
Lamp or lantern. L W Scheffers.
Lamp supports, expansible ring for. L J Atwood.
Lath, gate. G Rohrbach.
Latches, adjustable stop for taper turning. J Flather.
Leather skiving machine. J Barker.
Leather skiving machine. J R Scott.
Leather stripping machine. M J Ryan.
Ledger plate. P C Shibley.
Length indicator for fabrics. J W Woods and D I Barnett.
Lever controlling device. A H Johnson.
Lightning arrester. J W Gibboney.
Liquid separator, centrifugal. D J Davis.
Locks, electroprotective system for. M Martin.
Locomotive, electric. W H Knight.
Locomotive engine. C A Ball.
Match making machine. H A and W B La Chicotte.
Match, safety. W Barnhurst.
Mechanical movement. R Miehle.
Metal coiling apparatus. J Stephenson, Jr. and C J Johnson.
Milling and fulling machine. B Preston.
Movement, reversible traversing. L Koss.
Musical instrument keyboard. E A Edgren.
Numbering machine 2. J H Reinhardt.
Numbering machine 2. F Sanders.
Numbering machine. F W Wicht.
Nut, bolt. M Redlinger and C Morgan.
Oil burner. J M Merritt.
Oil can. C W Hart.
Oil can. W C Winfield.
Organ combination stop action, pipe. R W Jackson.
Organ, pipe. R W Jackson.
Overshoe retainer. F T Guiller.
Packing and gland, metallic piston rod. C H Ensign.
Packing or holding case. J Crocker.
Paddle wheel mechanism for propelling boats. J C Thomas.
Paper bags, making. E E Claussen.
Paper boxes, making. A C Lutz.
Paper folding machine. A Bradley.
Paper machines, wire gauze for. P Tourasse.
Paper roll tension device. W Black.
Pencil sharpener, grinder, protector and eraser, combination. R B Chambers.
Pendulum escapement. C E Buckbee.
Photographic camera shutter. A G Tisdell.
Photographs, method of and lens for making. H Vander Weyde.
Piano action. J Herrburger.
Picture exhibitor. J E Eklund.
Pipe coupling. W Martin.
Pipe joint. N W Condict.
Pipe lengths, fitting for connecting. G W Harrington.
Pipe or nut wrench. C Van De Water.
Pipes, machine for forming corrugated elbow. W C Winfield and J F McNitt.
Placket fastener for garment skirts. J Adrianson.
Planter 2. G W Murray.
Planter and fertilizer distributor, combined cotton seed. G W Murray.
Planter, check row corn. J W Parker.
Planter, combined cotton and corn. G Wittich.
Plaster, wall. A Hobbs.
Plastic material for replacing wood, metal, stone, &c. L P Heimer.
Plow. C Marsh.
Plow and subsoiler, undercut. H B Martin.
Plow attachment. O T Jensen.
Plow or cultivator. H Forman.
Plow, wheel. J W Swickard.
Postal card, return. J G Wallace.
Potato digger. A Smethurst.
Potato digger. N Strdy.
Power transmitting mechanism. D C Frezeur.
Preserving articles or structures. E M Caffall.
Printing attachment, bicycle. E Redmond.
Propelling mechanism for canal boats. H W Hildebrand.
Pulleys, compound for covering belt. A L and W J Hinton.
Pulleys, shafts, &c., slip collar for. C W Shurtle.
Pulp engine roll bar. J H Horne.
Pulverizing mill roll. E C Griffin.
Punch. W Hill.
Punching machine, eyelet hole. H Wright.
Pyrometer. E Brown.
Radiator, heat. C I Dangler and H Rappell.
Rail cambering apparatus. H C Ryding.
Rail or bar bender. M H Brown.
Railway frog. H O Shea.
Railway overhead switch, electric. M A Smith and W Chabough.
Railway rail chair. H O Shea.
Railway rail or tie distributor. C C Gates.
Railway signals, pneumatic system of and apparatus for handling. J W Thomas, Jr.
Railway switch. H B Buttel.
Railway switches, pneumatic system of and apparatus for handling. J W Thomas, Jr.

Railway system, conduit electric. J B Brand.
Railway track structure. E Sammel.
Railways, closed conduit for electric. P Plodock, Sr.
Railways, converter system for electric. G Westinghouse, Jr., and C F Scott.
Razor strops, machine for grooving. F R., and O Kaufpe.
Reaper. G W Murray.
Receptacle for small articles. T D Ingram.
Record, multiple. K Feun.
Reel and sprinkler, combination. W L Van Horn.
Refrigerating machine. J Levey, T H Butler and C A MacDonald.
Rolling mill edging guide. T Morrison.
Scale beam. S J Anstin.
Scarf pin safety device. M Crohn.
Seal, 4. E J Brooks.
Sewing apparatus, carpet stretcher for carpet. F Ames.
Sewing carpet corners, apparatus for. F Ames.
Sewing machine, hemstitch. C M Mercombie.
Sewing machine shuttles, thread cop for. H A Bates.
Sewing machine tack pulling attachment. A B Fowler and G E Warren.
Sewing machine tension device. G W Baker.
Shade roller. M E Reilly.
Shells for dynamite, apparatus for automatically manufacturing. H P Hall.
Shingle gage. B Hann.
Showstand. L J Haagen.
Sieve, grain cleaning and separating. C Cloz.
Sitter, ash. C Kasper.
Signal light fixture. W Carter, J W Dawson, and J Meyrick, Jr.
Smoke arrester. W P Shank.
Snow or ice melting apparatus. C F Springfels.
Snow plow. W Grunow, Jr.
Speed gearing. J H Pendleton.
Speed indicator bearing. W T Lintner.
Spinning different colored rovings into thread or yarn, apparatus for. J Lunn.
Spinning machine spindle. E J Fenderson.
Spraying machine. A Bryce.
Stamp groove or recess for shipping cases. C F Goodwillie.
Stave jointing machine. J Anthon.
Stay traveler. A K Evans.
Steam boiler. R Joy.
Steam boiler. T Murphy.
Steam boiler. F H Treat.
Steam engine. R B Davis.
Steam generator. C W Vandenberg.
Steam separator for boiler tubes. J J Hogan.
Stopper. M Rubin.
Stove or furnace. T Austin.
Stove, vapor. H Ruppel.
Sulky brake. L E Clawson and J A McKerron.
Suspenders. G E Adams.
Suspenders. J M Bohn.
Target and indicator. C Schifferdecker.
Telephone receivers, ear pad for. J W Kinniburgh.
Tenpin ball. C W Rodman.
Thill coupling. F Schelp, Jr.
Time ball. W F Gardner.
Time check receiver. A J Henry.
Tire setting machine. J B West.
Tire shield, pneumatic, 2. S M Schindler.
Tire, wheel. O Seely.
Transplanting machine. A Willner.
Tricycle. A Leiminger and E Shreiner.
Trolley. E M Tonsley.
Trolley wire support. L McCarthy.
Truck, electric motor. J C Henry.
Truck, stove. H M Putt.
Tub. W Gwynn, Jr., and D Spencer.
Turn table. J B Tinsley.
Type, method of and machine for justifying. J L McMillan.
Type writer case and table, combined. F C Wood.
Type writing machines, ribbon reversing mechanism for. F P Stiles.
Type writing machines, type cleaning device for. C A Jocrissen.
Valve. F W Hess.
Valve. G Oliver.
Valve, automatic exhaust relief. G de Laval.
Valve, sluice. W A Doble.
Vapor burner. H Ruppel.
Vehicle. J Johnston.
Vehicle. D D Price and R J Daniels.
Vehicle runner attachment, wheeled. S C Schofield.
Vehicle, two wheeled. J A Johnson.
Velocipede wheel. E E Fay.
Vending machine, coin actuated. F B Cochran.
Ventilating and furnace checking device. J B Watson and J R Douglas.
Ventilation, house. J McCreery.
Voltmeter, 2. E R Knowles.
Wagon brake. J Jacobs.
Wall finish compound. R E Hare.
Washing machine. J C., and W Benkema.
Washing machine. D P Edgar.
Watch bow fastener. D H Abney.
Water closets, automatic pull for. E D Andruss.
Water tube boiler. J J Hogan.
Water wheel governor, electrical. C S English.
Wheelbarrow. M V Garver.
Wheelbarrow tray. M V Garver.
Whiffletree. J C H Hobbs.
Windlass, grain shovel. J H Finley.
Wire stripper. J J Bettinger.
Womb battery. J C Petit.
Wrench. A Barceis.
Wrench. A McCallum.

PATENTS GRANTED JUNE 12, '94.

Adding machine. J P Royall.
Advertising match box. J J Harrison.
Ammonia, process of and apparatus for manufacturing aqua. T Charlton and K M Mitchell.
Animal trap. S L Loomis and A M Harris.

Axle box lid. N H Davis.
Axle box lid, car, 2. N H Davis.
Eadge. B S Whitehead.
Bait bucket. O M Muncaster.
Baling press feed attachment. J S Tuttle.
Band cutter and feeder. E J Vraalstad.
Barrel, knockdown. G R Lund.
Barrel making machine. P Little.
Bearing, ball. M Wogan.
Bench pin, guide, and knife, combined carpenter's. J H Fredericks.
Bevel. J T Langlais.
Bicycle. A H Bishop.
Binding and harvesting machines, sheaf carrier for. J Miller.
Boating ballasting device. J P Pool.
Boiler feed, automatic. H J Weissner.
Boiler water alarm. steam. P A Kirchner.
Boring bit. A A Borgeous.
Box. T Drummond.
Box machine. C B Southard.
Brace drill. E E Anthony.
Brake lever. C A Anderson.
Brick machine. H Stuckey.
Brick truck. D M Warner and C E Hammond.
Bricks, tiles, &c., facing. A L R Van den Berghen.
Broom head. J R Gilbert.
Buggy top support. T MacGlashan.
Burglar alarm. L S Bullington.
Burglar alarm. C R Hoopes.
Burner for the combustion of gas or vapor for heating purposes. H A and H A House, Jr.
Button. J V Pilcher.
Candles, apparatus for manufacturing hollow. L J B Fournier.
Car coupling. H Deitz.
Car coupling. J D Gooley.
Car coupling. A La Rue.
Car coupling safety attachment. J A Markley.
Car door. P T Mooney.
Car door. W L Ransome.
Car pilot or guard. R A Crawford.
Car safety guard, street. S Norton and W H Rice.
Car wheels, making. W A Pearson.
Cash register, 2. T Carroll.
Cash register and indicator. T Carroll.
Cash register, total adding. T Carroll.
Casket lining. F S Pinkham.
Casket pedestal. E E Fisher.
Centering tool. F B Covel.
Chain. R E Van Court.
Chain motor. F Elliott.
Clock winding mechanism, electric. A E Vidal and G Hevion.
Clothes drier. E E Gildersleeve.
Clover huller feeder. M T Reeves and J N Kailor.
Coal cutting machine. A Greenwood.
Column. N Paulson.
Composition of matter. J Matthews.
Composition of matter. W M Pope.
Condenser. S W Johnson.
Coop and hawk trap, combined chicken. W S Irwin.
Core attracting solenoid. W R Michl.
Cotton elevating apparatus, seed. F Garraux.
Crate, shipping. G W Worden.
Cultivator. N W Falor.
Cultivator. J Schumann.
Curtain stretcher. R J Bartley.
Cut out, automatic electromagnetic. L T Stanley.
Dental chair, 2. A W Browne.
Detaching block. G W Moore.
Disinfecting water closets, &c., sanitary arrangement for automatically. S A Johnson.
Diving apparatus. J and G Day and J Jenkins.
Door check, pneumatic. J W Ring.
Door hanger wheel. J A Triable.
Drum snare device. E A Lougee.
Duster. E Nation.
Ear jewels, attachment for holding. G H Tifford and A F Bennett.
Eaves trough hanger. F E Albrow.
Educational appliance. A Bechmann.
Electric battery. F Dubero and P Mohr-dieck.
Electrical conductor bond. J Herr.
Electrical distribution, system of. T J Fay.
Elevated carrier. G B Davis.
Elevator driving mechanism, electric. C E Geiger.
Embroidering machine. R Weiss.
Engine. E J Woolf.
Envelope. C M Carnahan.
Envelope machine. L J and M J Church.
Eraser, blackboard. A J Creamer.
Evaporating liquids in vacuo and apparatus therefor, process of. S M Lillie.
Explosive and making same. H Kolf.
Feed water and gas supply regulator. H A and H A House, Jr.
Feed water heater and purifier. F Diehl.
Felly, bicycle wheel. A P Squires.
Felly wheel. J T Mosely.
Fence. G C Snyder.
Fence, wire. M Bordan.
Fence, wire. S S Young.
Ferrule. W H Gaskill.
File, newspaper. J Gruninger.
Fire escape. F J Fairchild.
Fire escape. C A Noack.
Floor cloths, machine for the manufacture of solid color. J S Farmer.
Fly trap. A Peltier.
Fuel, composition for artificial. J F Quinn.
Furnace. T E Caddy.
Furnace door. C K Pickles.
Garment fastening. M C Maran.
Garment supporter. F G Davis.
Gas engine. S D Shepperd.
Gases, process of and apparatus for analyzing. E A Uehling.
Gear forging, making dies for. A T Porter.
Gear wheels, process of and apparatus for making. A T Porter.
Glass furnace breast wall. W H Barr.
Glue, process of and apparatus for making. P C Hewitt.
Governor for fluids, pressure. W Hoffman.
Gun, folding. A Burgess.
Guns, automatically operated breech mechanism for. J B G A Canet.

Handle. P Oswald.
Harrow. N O Starks.
Harvester bundle carrier. J J Courtney.
Hay press feeder. H Fette.
Hay rake, horse. O Richards.
Hay rake, tedder, and loader, combined. J H Ridings.
Heater. D S Richardson.
Heating apparatus. E R Soleau.
Heating apparatus, steam. C H Robinson.
Heating, illuminating, or culinary purposes, appliance for. F E Browne.
Hinge, lock. W T Bessonette.
Hook and eye. J F Schoeppl.
Ice cream freezer. W R Thatcher.
Index. J E Spears.
Infusions and maintaining supplies of hot water or liquid, apparatus used in making. J Childs and C J Jones.
Jalousies, band or cord self acting uproller on. S Stahl.
Knitting machine. L E Salisbury.
Knitting machine cam. G H Gilbert.
Knitting machine, circular. E W Gourd.
Knitting machine stop motion. E Tiffany.
Knitting machines, fashioning device for circular. J B Paxton and E I O'Neill.
Knitting machines, quarter saver for flat rib. E Tiffany and G E Parker.
Knitting machines, stop motion for straight. E Tiffany.
Knockdown box. B L Gale.
Knockdown chair. A R Van Norman.
Ladder. F R Mallory.
Lamp. W A Phillips.
Lamp, automatic electric signal. J R Farmer.
Lamp, duplex electric arc. G F Edens and J B Brewer.
Lamp socket, incandescent. L R Peck.
Lamps with oil, apparatus for automatically filling. L S Lewis.
Lantern holder for wagons, &c. G J Beehler.
Lantern, signal. P Gray.
Lanterns, electric arc light for magic. C Beseler.
Last. S Appleton.
Lathing, metallic. G Hayes.
Leg, artificial. J McGuire.
Limekiln. J O Connell and G Sniffin.
Lock. W W Davis.
Locomotive attachment. F J Smith.
Locomotive engine, compound. C A Ball.
Locomotive shifting link motion. W B Warren.
Loom warp stop motion. O Smith.
Measuring and recording electric currents, apparatus for. W Thomson.
Mechanical movement. R Sterling.
Metals, making resins of. F Pirsch.
Moistener for stamps, envelopes, etc. J G Willits.
Mop wringer. E H Noble and J W Ward.
Music box damping device. H Langfelder.
Musical instrument, stringed. C L G Bach.
Musical instruments, device for tightening strings of. G Heredia.
Nails, machine for preparing and finishing. J M Laughlin.
Nut finishing machine. G Dunham.
Nut wrench lubricator, combined. J S Scarborough.
Oil and water separator. E Anstin.
Oiling bearings, mechanism for. G Gessner.
Paper boxes, machine for covering. E H Taylor.
Pavement, road. G R Bowen.
Pencil sharpener. J L Hall.
Picture hanger. P H Lynch.
Pile shoe. A Harris.
Pipe bending machine. J C Orr.
Pipe coupling, combination soft and hard metal. S M Friede.
Pipe dies, screw dummy for sewer. A F Foster.
Pipe hanger. R Boyd.
Pipe wrench. W King.
Placer feed roll. J D Sigler.
Plume fastener for helmets. L A Hayes.
Printing machine, ticket. W B Gray and D F Bowen.
Printing press counting attachment. H La Fountain.
Printing press, rotary. J P Luhn.
Propelling mechanism, boat. C P Dieco.
Pulley, clutch. H Bunker.
Pulley, friction clutch. T E Kirkbride and C E Onnam.
Pulley turning machine. A Wood.
Pulp engine. L A Thomas.
Pulp screen. E M Hall and F Pearse.
Pump, regulator, hydraulic steam. T J Davis.
Pump, vacuum. E D Chaplin.
Punch for checks or other papers, figure. J B Backus.
Railway carriages, ventilating. S Hughes.
Railway cross tie. F P Fenchbacher.
Railways, conduit supply system for electric. H Alexander.
Rams, machine for maintaining air pressure in chambers of hydraulic. H Ing-ham.
Rasp making machine. J H Stokes.
Reel. M E Knight.
Reel. C C Partridge.
Rubber article, hollow. E L Perry.
Sash fastener. G C Gardner.
Saw. D Hazard.
Sawing machine. J Jilek.
Scale. S S Crompton.
Screw cutting machine. M D Luehrs.
Seal. E L Torsch.
Separator and grader. D J Davidson.
Sewing machine. C A Dahl.
Sewing machine. J Holroyd, C B Hunt, and R J Johns.
Sewing machine. C F Littlejohn.
Sewing machine. R W Thomson.
Shades, &c., device for adjusting window. P Goldmann.
Shades, fixture for vertically adjusting window. N Bosmann.
Shaft setting device. H B Campbell.
Sifter, ciuder. A J Henderson.
Sink. E F Ford.
Skate. J W Kenney.
Skates, self acting brake for roller. J Riedel.

Snap hook. J Pickett.
Spoke tenoning machine. J O Lade.
Spool and support thereof. A Kreidler.
Spring jack cleaner. M Seter.
Stapling machine. W S Hamm.
Stamping device, hand. H S Ingersoll.
Station indicator. A Baker.
Steam boiler. J A Caldwell.
Steam boiler, tubulons. H A and H A House, Jr.
Steam generator. D Birdsell.
Stone, artificial. L Grote.
Stone screen. J S Donovan.
Store service apparatus. J S Goodnow.
Stove, cooking. R H Hayes.
Stump extractor. W R Wilkinson.
Stump puller or load lifter. M Allmon.
Supporter. D L Smith.
Suspensory. A H Parker.
Swing. W E Crandall and M Smith.
Switch board, busy test for multiple. J A Wotton.
Tanks, automatic shut off for roof. C F De Arden.
Telegraph, printing. O L Kleber.
Telegraph system, police signal. C A Rolfe.
Telephone call recorder. W F Smith.
Telephone, electric. W L Richards.
Telephone, magneto. A Stromberg and A Carlson.
Telephone switch. J B Smith.
Telephone transmitter. J B Smith.
Testing machine. L Schopper.
Thermo electric battery. E W Jungner.
Thermometer. A A Keene.
Thread cutter tool holder. C R Rehnke.
Tire, bicycle. R P Scott.
Tire, pneumatic. A J Burns.
Tobacco pipe. W Demuth.
Tobacco pipe. N Macphail.
Tobacco pipe bowls, cover for. T. Morton.
Tobacco tying machine. R Tell.
Top. J O Barr, Jr.
Toy holder. F D Arthur.
Track circuit. L F Johnson.
Trolley. Hand J P Scheele and H A Rust.
Trolley, contact. R W Hawkesworth.
Trolley wire finder. T E Gressle.
Truck, car. E Cliff.
Trunk strap fastener. W J Webb.
Tubular boiler. J J Brown.
Tubular boiler. J P Serve.
Type leveling and aligning device. L P Diss.
Type writing machine, ribbon reversing mechanism for. C E Johnson.
Umbrella, self opening. H W Schoff, B Finkle, and F E Probert.
Umbrellas, &c., flexible support for. W J Yapp.
Underwaist. C R DeBevoise.
Upholstery pendant or ornament. G F Hensel.
Valve, ball cock. W A Turner.
Valve, engineer's. W A Thacher.
Vehicle brake. C Sample.
Vegetable cutter. D M Wright.
Watchcase. J Durrstein.
Water elevator, steam vacuum. P Sattelkau and H R Winkelmann.
Water elevators, storage reservoir for steam vacuum. P Sattelkau and H R Winkelmann.
Water heater. J S Heaton.
Water wheel. C A Chase.
Water wheel, turbine. J M Parker.
Weighing, electric apparatus for automatic. C E Bazby.
Well digger. A Odewahn and F Reichart.
Whist box, duplicate. A H Woodward.
Window. C Ajello.
Woodworking machine. C Seymour.
Woodworking machinery, anti vibratory pressure bar for. A Premo.
Wrench. W C Barr.
Wrench and pipe and thread cutter, combined. R Haberthur.
Wrench for pipes, rods, &c. C Hall.
Writing machine. W B Wait.

PATENTS GRANTED JUNE 19 '94.

Air and steam engine and generator, mixed. H E Depp.
Album, photograph. G Koll.
Annunciator and spring-jack, combined. H M Fisk.
Armature for dynamo electric machine. E W Rice, Jr.
Axle lubricator. F P White.
Baling press dog or stop device. A Schnlze.
Beam framing machine. E H Ireland.
Bed bottom, spring. D Leonard.
Bedstead, cabinet or wardrobe. F W Nye.
Belt, electric. E M Miles.
Billets, ingots, &c., apparatus for handling. H Oliver and E Scott.
Boiler. A Jaeger.
Boiler. J H Reader.
Boiler feeders, automatic controlling device for. J Desmond.
Boiler furnace, steam. O D Orvis.
Book, check. R W Morgan.
Book cover. H K Greble.
Book rest for hotel register. C A Thompson.
O G Emshiveller.
Bottle. C Clark.
Bottle capping apparatus. N B Abbott and H Rau.
Bottle, nursing. W M Decker.
Bottle sealing and stopper retaining device. N B Abbott.
Bottle stopper. J C Grout.
Bottle stopper. G L Mathews.
Brick or terra cotta house. G E Hagerman.
Bricks, manufacture of. C B Cox.
Brooch pin safety attachment. A F Bock.
Brush machine. H Besson.
Burial case. J F Hobson.
Cabinet, housekeeping. B S Wilkins.
Can opener. M Dallas.
Cans, &c., frame for carrying. P Scholten.
Cardle shade holder. R W Morgan.
Car coupling. E L Bolter.
Car coupling. W Brooking.
Car coupling. W C Nelson.
Car coupling. A Root.
Car fender. J Tobin.
Car fender, safety. F H Reich.
Car fender, tram. S J Rosenfeld.
Car motor, electric railway. J C Henry.

- Car or locomotive fender. J B Krause and R H Crosby.
- Car safety appliance, street railway. O R Routh.
- Car ventilating device. C B Hutchins.
- Car wheel. L J Hirt.
- Carpet fastener. P Ceovich.
- Cash register. J P Cleat.
- Cash register. C G Smyth.
- Cash register. R P Thompson.
- Casting sand molds. S J Adams.
- Ceiling, metallic. E Armstrong.
- Center board, adjustably weighted. F W Brewster.
- Chart, geocentric astronomical. A H Molesworth.
- Cheese holder. L C Hiller and W R Mackay.
- Cheese or orange holder. L C Hiller.
- Chlorin gas, process of and apparatus for absorbing. P J Worsley, W Windus, and B Bracey.
- Chute, ash. L Bofird and J Blackman.
- Cigarette making machine. J R Williams.
- Clamp. W Kline.
- Clutch, adjustable friction. G H Smith.
- Coffee substitutes, making. R Rahr.
- Coin display. J P Cleat.
- Condenser, surface. S W Johnson.
- Copy holder. J E Bucklin.
- Cotton handling apparatus, governor for seed. A Schulze.
- Cotton press. W L Bessonne. (Reissne).
- Cover for butter receptacles, &c. H C Carter.
- Crate, folding. A W Coats.
- Creamer, centrifugal. J Melotte and W Reuther.
- Cultivator, lister. S D Poole.
- Cultivator shovels, device for attaching. S D Poole.
- Cultivator, wheel. S D Poole.
- Current regulator, alternating. O Offrell.
- Cycle canopy and support. W T Jordan.
- Damper. E Webster.
- Door and hinge. W Vaughan, Jr.
- Door cheek, pneumatic. J W Wetmore.
- Dredger. L W Bates.
- Dust collector. E R Draver.
- Eaves trough hanger. H A Berger.
- Electric meter. E Thomson.
- Electric power, meter for recording measurements of. E Thomson.
- Elevator safety attachment. F W Jandell.
- Engine cut off, steam. W Jaekaway.
- Engine expansion gear. M H Robinson.
- Engine expansion gear. M H P R Sankey.
- Engine starting apparatus, gas. J W Raymond.
- Envelope. M J Cramer.
- Evaporating apparatus, liquid. W J Mirrlees and D Ballingall.
- Excavating apparatus, ditch. G B Christie, J Lowe, and G L Lederle.
- Excavator. G P Anderton.
- Fabric, machine for making looped. E Murly.
- Fancet, oil can. G W Arper.
- Feed water heater. B Eynon.
- Fence. P H Christie.
- Fence, portable worm. C B Wilcox.
- Ferrule. W H Gaskill.
- Filter. C Haflner.
- Filter. E P Lynn.
- Filter press. H Beeg.
- Firearm hammer guard. M L Campbell.
- Firearm, magazine. P Sheekler.
- Fire escape. J Eckley and J C Strickland.
- Fishing rod line guide. S T Davis.
- Floot. D M Ireland.
- Floor dressing or polishing machine. W W Murray and T W Cromer.
- Foot or hand power. J A Wilkin.
- Gage brace. J F Alley.
- Game board or apparatus. H W C Smith.
- Garment supporter. C J White.
- Gas generating apparatus. H F D Schwahn.
- Gas governor. S H Moore.
- Gas meter. F C Viney.
- Glass melting furnace. E H Everett and A Samuelson.
- Governor, centrifugal high speed. E W Spaake.
- Grain binder. D McPherson.
- Grinding machine. R Dutton.
- Grinding twist drills, device for. E F Hoffmann.
- Halter. T B Burnett.
- Harvester, corn. W K Liggett.
- Harvester elevator. A Stark.
- Harvester frictional cloth. H C Stone.
- Harvesting machine, corn. J A Stone.
- Harvesting machine, corn. J B and G T Tuckerman.
- Hat pin retainer. C P Thomas.
- Hay press feeder, automatic. W H H Johnson.
- Hearse. C Edwards.
- Heel trimming machine. C H Trask.
- High speed engine. J Dow.
- Hinge, concealed. A A Oat, Sr.
- Hinge, self closing concealed. A A Oat, Sr.
- Horse detacher. B Blake.
- Horseshoe. W F Downey.
- Horseshoe calk sharpener. A B Smith.
- Horseshoe pad. A L Grant.
- Insole grooving machine. G A Cole and E H Taylor.
- Invalid chair. O L Smith-Fraser.
- Ladle, pouring. S J Adams.
- Lamp for bicycles, electric. G Mayr.
- Lamp lighter. A H Todd.
- Lantern or lamp extinguisher. C W Cottrell.
- Lathe. W F Barnes.
- Lathe for relieving taps. W A Robertson.
- Lathing, metallic. G Hayes.
- Leather cutting machine. P Goldstein.
- Lighting, magazine. F Goff and T H Joiner.
- Locomotive coupling, electric. E D Priest.
- Locomotives, oil cellar for driving boxes for. F H Taylor and F Riley.
- Loom. E G Johanson.
- Loom shuttle box operating mechanism. G W Stafford.
- Lozenge machine. H Lucas.
- Lubricator. C Couse.
- Mail marking machine. M V B Ethridge.
- Mail marking machine. M V B Ethridge and H E Waite.
- Mail matter, machine for marking. F N Ethridge.
- Manhole cover. J P Roe.
- Manhole covers, yoke for. J P Roe.
- Metals, agalust corrosion, preparation for protecting. A Buecher.
- Milk cooler and aerator. H W Gazlay.
- Milling machine. C H Trask.
- Mitering machine. H A Riemann.
- Mold forming apparatus. S J Adams.
- Mortar making apparatus. T D McClary.
- Music box, coin controlled. H Langtelder.
- Music leaf turner. W C Boeing and T P Stork.
- Musical instrument. B H Mommense.
- Nut and bolt lock. F P Johnson.
- Oil for bicycles, &c. L Hirsch.
- Oiler, locomotive. J H Turner.
- Ore grinder and amalgamator. C N Moore.
- Oven. W H Wilder.
- Packing box, rod or valve. D Spencer.
- Paper cutter, self clamping. C L Smith.
- Paste, making dry adhesive. P Vandenberg.
- Peeling machine, potato. D Grant.
- Pencil holder and sharpener. H A Veazie.
- Phonograph erasing attachment. E H Amet.
- Phonoscopic plates, producing positive. G Demy.
- Photograph display cabinet. H W Potteiger and W A Kolman.
- Pipe coupling. W W Gage.
- Piston rods to cross heads, device for securing. E J Armstrong.
- Planter, hand seed. W Dulin.
- Plow and seed sowing attachment. G W Johnson.
- Potash alum and alumina, making. J Heibling.
- Power storage apparatus. A G Page.
- Preserving food compounds. E F Anker.
- Printing machine, stencil. W G Fuerth.
- Pump for drilled wells. D Lippy.
- Pumping apparatus for gas, air, water, &c. G P Schneider.
- Radiator. J Johnson.
- Rail joint. M O Perkins.
- Railway, cable street. F Hoch.
- Railway, conduit electric. T Armat.
- Railway rails, fish plate splice for connecting. W J Sheldon.
- Railway signal, electric. C R Alsop.
- Railway signal, electric. B Samuels.
- Railway supply system, electric. T Harris.
- Railway switch. L N Jagel, C G Smith, and A B Pruden.
- Railway switch. D F Vaughan.
- Railway switch and signal. S S Heim.
- Railway switch, automatic. L Washington and W H Roberts.
- Refrigerator and filter combined. C L Sherwood.
- Register for rotations of vehicle wheels, &c. H D Studabaker.
- Riding habit. F Schafer.
- Roll holding camera. A Deling.
- Roof fastening, metallic. J O Pew.
- Rotary engine. H P Holland.
- Row boat. M F Davis.
- Rule, draftsman's. F W Altpeter.
- Saddle girth ring. I H Reed.
- Safety bolt. P Burns.
- Sand mold. S J Adams.
- Sand molds, apparatus for forming. S J Adams.
- Sanding device. W Grunow, Jr.
- Sash fastener. C C Algeo.
- Sawing knife handle blanks, machine for. F C Feicker.
- Sawmill dog. J H Miner.
- Scale, weighing. H Paddock.
- Screen for half tone process. M Levy.
- Screw cutting machine. D J Jones and W L Clouse.
- Scribbler or carding engine. E and W M Crowther.
- Seal. E J Brooks.
- Seal. F W Brooks.
- Search light. O G Cates, Jr.
- Sectional boiler. G A Watson.
- Self closing can. I Sexton.
- Self opening gate. G L Duncan.
- Separating machine, centrifugal. O Ohlsson.
- Sharpener and hone stone holder, combined knife. P Birch.
- Shears. D H Hollingsworth.
- Sheet metal pipe. C S Hamlin.
- Shelving. A B Wagner and E Liesenhoff.
- Shirt. H A Hagen.
- Shoe fastening. T U Walter.
- Signal device, safety switch. H M Abernethy and J M Graham.
- Skate. J L Whelpley.
- Sleigh, tubular. J S Johnson.
- Slicer, vegetable. N and T Heineault.
- Smoke consuming furnace. J Graham.
- Smoke consuming furnace. J M Williams.
- Snow cleaning attachment for locomotive engines. M F Maunden.
- Speed mechanism, variable. A Sequeira.
- Spikes, making. J J O'Neill.
- Spinning frame, ring. P P Craven.
- Spool turning machine. E Hubbard.
- Spreader, animal. J E Perl.
- Stair pad. M H Marens.
- Stallion shield. J W Fitzgerald.
- Stamp canceling and postmarking machine. M V B Ethridge.
- Stamp canceling machine. F N Ethridge.
- Stamps to envelopes, &c. Device for affixing postage or other. J C Stechman.
- Steam boiler. D Ahern.
- Steam engine. P B Landgraf.
- Steam separator. G W Aulmann and W R Harris.
- Steering apparatus, steam. E Heyde.
- Stove, cooking. A B Clunies.
- Stove lid lifter. A Shepard.
- Stove, meat broiler gas. B S Koll.
- Stove, oil or lamp. H P Wilder.
- Stovepipe elbow. C and A Lindemann.
- Street sweeper. G Morrow.
- Stump extractor. J C Sharp.
- Sucker rods, adjustable socket clamp for. J A Kidd and G W Hess.
- Sulky. S Elliott.
- Surgical instrument. W Scheerer.
- Telegraph, printing. E Pope.
- Telephone switch. A Stromberg and A Carlson.
- Thrashing machidg. J Hawk.
- Thrashing machine feed and band cutting attachment. M Schlatter.
- Tire and rim for wheels, pneumatic. J W Smallman.
- Tire, pneumatic. P W Tillinghast and F Malladien.
- Tire tightener. W T Mackey.
- Toothpick machine. C F Scamman.
- Toothpicks, apparatus for handling and packing. C F Scamman.
- Toothpicks, apparatus for handling and packing. C F Scamman and H P Churchill.
- Towage, canal. J I Morris.
- Toy bank, registering. A W Coffin.
- Traction wheel. S Warner and O E Cook.
- Trolley pole catcher. O G Cates, Jr.
- Truck, car. S Fox.
- Trunk lock. E A Judd.
- Tub roller and shaper. W B Sylvester.
- Tube expander. C W Umboltz.
- Tug fastening, hane. W P Gelabert.
- Tuning device. D M White.
- Tunnels, centering for. J McNamara.
- Turbine. G M Hopkins.
- Type writing machine. J H Hudson.
- Unicycle. H J Sacksteder.
- Valve for expansion cylinders of vapor compression engine. E Riegelmann.
- Valve for water gages, ball. G H Wall.
- Valve, slide. E Heyde.
- Valve, steam engine slide. F P Malone.
- Vapor burner, multiplex. R E and W S Olds.
- Vehicle brake. J C F Harst.
- Vehicle brake, side bar. T H Carter.
- Vehicle wheel. C L Ames.
- Velocipede. G H Day.
- Velocipede, ice. L Grieneisen.
- Ventilator. W F Wolfe.
- Veterinary drenching bottle. P Schaefer.
- Vibrating piston engine. W E Crist.
- Vise, blacksmith's. A Lennou.
- Vises, means for operating sectional cuts of. J E Boegen.
- Washing machine. J A Mengel.
- Watch jewels, mechanism for loading. L N Jackman and C A Smith.
- Water meter, rotary. P Ball.
- Water purifying apparatus. L Archibut and R M Decey.
- Wheel. J M McMaster.
- Window. G Giglio.
- Window guard and shade attachment. T Euphrat.
- Window, swinging. M F Mahoney.
- Wire fabric tool. S S Casey.
- Wrench. F E Burgevin.

PATENTS GRANTED JUNE 26, '94

- Accumulator plate. C J Babrier.
- Adding machine. R Bannmann.
- Adding machine, electrically operated. R Baumann.
- Advertising device. B D Milliken.
- Advertising device. A A Root.
- Advertising letter. T E Dean.
- Animal trap. M B Morris.
- Anvil, jeweler's. O H Lutz.
- Ash ejector. F E Kirby.
- Axle box lid. P N French.
- Axle lubricator, car. D McCarthy.
- Baby carrier. S Kellenbeck.
- Barack. W A McHarty.
- Barrell, packing. E T Mason.
- Bath tub. A G Ward and W C Winfield.
- Battery grids of forced leads, machine for making storage. W W Griscorn.
- Battery plates, forming storage. C Sorley and J K Pumpelly.
- Bearing, ball. J H Myers.
- Bedstead, wardrobe. L Harris and M Jaiser.
- Beehive. F Danzenbaker.
- Bicycle canopy. L Z Jenkins.
- Bicycle saddle. F E Weaver.
- Bicycle wheel. G W Smiley and F W Duu-lap.
- Boiler cleaner, automatic. A L Bauhard.
- Boiler furnace, steam. A J Hodgson.
- Boiler furnace, steam. O D Orvis.
- Boilers, apparatus for inserting, finishing, and securing spits in. W S Shippe.
- Book cover, adjustable locking. M W Cummings and T F Jordan.
- Book, duplicating cash or receipt. E E Garrett.
- Bookkeeping, system of. W Hinrod.
- Boot tree. J Macdonald.
- Bottle closure. R Flanagan.
- Bottle stopper. B Boley.
- Brace and bit gage. C Whitus, J W Wilks, and N J Whitus.
- Brake beam. C T Schoen.
- Breech bolt. F J Penn and J Deeley, Sr.
- Bridle. T Marcum.
- Broom making machine. P B Donahoe.
- Brush bath. G W Worden and H Huettig.
- Building block and apparatus for manufacturing same. H Behrens.
- Bullet mold. G P Riggs.
- Burglar alarm, electric. A Stromberg. (Reissue.)
- Burnishing machine. T Gare.
- Button drilling machine. J Webb.
- Button, separable. T E Anderson.
- Buttons, apparatus for forming pearl. G Carlyle.
- Can crimping machine. J B Roberts.
- Can testing machine. J B Clot.
- Can testing machine. W B Mann.
- Canal traction device. F A Pocock.
- Car coupling. C H Andrus.
- Car coupling. J O Mitchell.
- Car coupling. W T Wilson.
- Car door. H E and H E Hoke, Jr.
- Car door. I V Kelly.
- Car, dump. P Peterson.
- Car fender. H G Chatain.
- Car fender. M and V F Maidhof.
- Car guard. G Boehm.
- Car life guard. J J Beals.
- Car safety guard. J W Betz.
- Car safety guard. A Soffrel.
- Car seat, reversible. R H Weatherly.
- Car wheels, apparatus for manufacturing. J Parkinson, Sr.
- Car wheels, manufacturing. A J Fisher.
- Cars, flexible belt fender for street railway. R B Chambers.
- Cars, means for suspending electric motors from. R Lundell.
- Cars, safety appliance for street railway. F W Jenkins.
- Cars, wheel fender and safety attachment for street. F H Homan.
- Carriage, child's. H I Humphrey.
- Cash receipts recording apparatus. C Gotschalk.
- Cash register. R M Hunter.
- Cash register. R P Thompson.
- Chain wrench. J H Vinton.
- Chair bottom. C Singer.
- Children's, apparatus for the construction of. H C Rowell.
- Churn dasher. J W Ricker.
- Cigar holder. F D Van Wickel.
- Cigar piercer. J W Miller.
- Cigarette selecting and boxing machine. J N Wood.
- Circuit maker. D F Hall.
- Cistern. T J Shearer.
- Clamp. W Yeager and B E Westlin.
- Clock, electric alarm. S F Whitney.
- Clothes line fastener. H Betka.
- Cocks automatically, machine for grinding. C M Jarvis.
- Coffee drying apparatus. R P Hocking.
- Commutator. J C Fyfe.
- Concentrator. C Wallace.
- Concrete monument, method of and apparatus for making. N C Cameron.
- Condenser. C S Cox.
- Condenser. E H Wardwell.
- Coop, folding poultry. I T Carter.
- Cot, folding. T Sands.
- Cotton stalk breaking machine. Y Grimland and J J Ringness.
- Cover, milk jar. C N Wilcox.
- Curling iron holder. M A Sheldon.
- Current machines, controller for alternating. E B V Seaverns.
- Curtain holding device. O Anderson.
- Dental plate. T H Graham.
- Display rack, wall paper. C M and H B Patterson.
- Door check. J Suter.
- Door secret. F J Smith.
- Dough raising apparatus. J Boudry.
- Draft beam fastening. J A Markley.
- Drilling swivel, ball bearing. W W Swan.
- Dust pan. M Cote.
- Dye, blue. M Moeller.
- Dyeing apparatus. J Redfitt.
- Electric lighting system, transformer. P Wright.
- Electric machine, dynamo or magnet. L Paget.
- Electric machine, brush holder for dynamo. R Fuller.
- Electric motor. J Lee.
- Electric wires, automatic safety joint for. J H Curry.
- Electrical distribution, transformer system of. P Wright.
- Electrically operated register. S J Glass.
- Elevator and dump. W L Oakes.
- Elevator controlling device. C A Harkness.
- Emery wheel bearing. O S Walker.
- Engine indicator, steam. E J Rea.
- Envelope letter sheet, circular, and casing, combined. W A Wright.
- Evaporating apparatus, liquid. C W Cooper.
- Excavator and elevator. H P Holland.
- Extension table. J Bohr.
- Extension table. M H Young and J M Mathews.
- Eyeglasses. W F Kornemann.
- Eyes, apparatus for testing. C M C Prentice.
- Fan, ventilating. W H McConnell and F A Ray.
- Fastening device. J Zeiser and F A Leeman.
- Feed water heater and purifier, combined. E G T Colles.
- Fence machine. W C Shoemaker.
- Fence post. P C Cretcher and J R Miller.
- Fence tightening implement. G D Lockwood.
- Fiber drier. F G and A C Sargent.
- File, ready reference. W L Van Harlingen.
- Filter. J A Bowden.
- Fire alarm. P J Regan.
- Fish line reel. N H McGregor.
- Fishing apparatus. P S and A J Downie.
- Fishing float. G H Rawlings.
- Flax puller. F L Benjamin.
- Floor and ceiling construction, fire proof. J Seipel.
- Flushing apparatus for urinals, &c., automatic. W Clark, A Cameron, and C Kirk.
- Food products from cereals, machine for the manufacture of. H D Perky.
- Fruit can. C Schifferly.
- Game apparatus, coin controlled. W M Keane.
- Game counter. H C Phillips.
- Game table. G Hunzinger.
- Garment supporter. G E Adams.
- Garment supporter clasp. C W Stimson.
- Gas burner, illuminating. C A Shaw.
- Gas generator and burner. C F Santord.
- Gas meter. E Haas.
- Gas retort lid. C C Walker.
- Gate. F S Gray.
- Gate. E Neuhauser.
- Glass, composition for manufacturing. A P Ayling.
- Glove, boxing. R N Carson and A A Martin.
- Glue into sheets, apparatus forming. C W Cooper.
- Glue making apparatus. C W Cooper.
- Glycerin and salt from spent soap lye, recovering. E K Mitting.
- Glycerin from glycerin foots, recovering. J Van Ruymbeke.
- Glycerin from spent soap lye, apparatus for recovering. J Van Ruymbeke.
- Glycerin, process of and apparatus for distilling. J Van Ruymbeke.
- Gold from its chlorid solutions, separating. J W Sutton.
- Gold or silver from ores, process of and apparatus for extraction of. J W Sutton.
- Grain meter. C L Wylie.
- Grain storage building, metallic. E O Fallis.
- Grapple. D E Lyon.
- Grave signal. H Deveau.
- Grinding and polishing machinery. E Ford.
- Grinding machine. T B Dooley.
- Gripping device. C W Nason.
- Gun, breech loading. I N P Stokes.
- Gun, rawhide wound. F Latulip.
- Hame hook. A Thomson.
- Harrow. J Porteous.
- Harrow and scraper, combined. I Smith.
- Harrow attachment. B M Mills.
- Harvester and husker, combination corn. J Drake.
- Harvester, corn. W F Ziegler.
- Hat pin. A J Mullican.
- Hay press. R H Walton.
- Hay rack. G Hausmann.
- Heat motor plant. R D Kinney.
- Hitching device, stock. S L Clark.
- Horseshoe. J H, J R, and W E Smith.
- Hose cart. E and L Shay.
- Hose reel. J B Hunter.
- Hot air register. R R Baehler.
- Hydraulic elevator. J Reichmann.
- Hydrocarbon burner. C S Edmonds.
- Ice creeper. J R Russell.
- Insulator. J M Anderson.
- Ironing board. J W Hiett and T C Cole.
- Jewel piping machine. D H Church.
- Keyboard mechanism for playing upon stringed instruments. E J DeVlamack.
- Keyboard, movable. L J M Duvivier.
- Knitting machine needle actuating cam. H A Houseman.
- Knitting machine, warp. C B Sander.
- Knockdown case. M M Cleeley.
- Lamp, electric arc. W J Davy.
- Lamp, electric arc. S P Johnson.
- Lamp, electric arc. L B Marks.
- Lamp hanger. T Hancock.
- Lamp lighter, electric. J F McLaughlin.
- Lamp, safety. T Lowther, H Teal, and R Hay.
- Lamps, adjustable carrier for electric. R Faries.
- Lampblack or carbon black machine. J E James.
- Lantern. G W Jarmin.
- Lantern. M G Stevens.
- Lasting machine. E F Grandy.
- Lathes, means for centering face plates for. E Reynolds.
- Letter box. T C Chappell.
- Letter box. G L Savage and W H Harrison.
- Light support. J R Hughes.
- Line fastener. R M Christensen.
- Linotype machine. O Mergenthaler.
- Lock and latch, combined. E E and J E Mix.
- Locomotive sanding device. F T Chase.
- Lubricating device. H A and H A House, Jr.
- Lumber drier. W L Burton and H Meyerding.
- Machine table. J E Bradley.
- Magnetic separator. H Carmichael.
- Mail marking machine. F N Ethridge.
- Mask, fire. G Pozdena and F Churau.
- Match box. J P Wright.
- Measure case, tape. W L E Kenfelf.
- Measure, steel tape. W L E Kenfelf.
- Meat cutting machine. M Lyth.
- Mechanical movement. J C Butler.
- Metal bars, &c., machine for cutting. W F Everett.
- Metal boring machine. D Stevenson.
- Metals electrically, heating. C L Coffin.
- Metallic bodies, means for making. H C Wolfe.
- Mine trap door. G J Herth and G Bonenberger.
- Miter box, adjustable. J Luscher.
- Model stand. C Sullivan.
- Molding apparatus. S J Adams.
- Monocycle. J W Finch.
- Motor or pump. C E Brown.
- Music leaf turner. F A Meyer.
- Nozzle, can. G J Record.
- Nut lock. D Boyer.
- Nut lock. J C Brown.
- Nut lock. W T Richardson.
- Oar lock. J D Prescott.
- Office door indicator. W D Lawrence and F A Hopkins.
- Oil can. G A Rawhouser.
- Oils, fats, and fatty acids, purifying fixed. F L Dyer.
- Oils, purifying illuminating. W B Price.
- Organ pump. H and J Schwesinger.
- Oven, bake. J Middleby.
- Oyster dredge. A D Post.
- Package wrappers, fastening device for. W B Coulter.
- Padlock. W E Sparks.
- Paint, composition for removing. E Tessen.
- Paper making machine, thickness gage for. O W T Am Ende.
- Paper strips on pasteboard, apparatus for applying gummed ornamental. J Temler.
- Piano attachment. C Salence.
- Piano sounding board. E G Schleicher.
- Pipe coupling. J J Burke.
- Pipe plug, soil or other. H G Tillinghast.
- Planter, corn. C A Beestelcor.
- Plow, sulky. C Anderson.
- Potato digger. B A Reynolds.
- Powders, manufacturing metallic. J Sachs and E Huber.
- Printing indigo. A Blanchon and A Allegret.
- Printing machine, multiple color. W H R Toye.
- Printing machine printing plates, registering attachment for. W H R Toye.
- Pulley block. O M Mowat.
- Punching and forming machine. C P Higgins.
- Push button. J F McLaughlin.
- Radiator, steam. H W Stone.
- Rail, guard. G B Ames.
- Railway carriages, ventilating. S Hughes.
- Railway, conduit electric. C J Reed.
- Railway crossing gate. L Harris.
- Railway rail joint. H Roberts.
- Railway switch. H H Matt.
- Ranges, heaters, &c., means for lighting gas. C H Page, Jr.
- Refrigerator. F Jacoby.
- Refrigerator car. F J Canda.
- Refrigerator car. T J Gilmartin.
- Rheostat. B E Baker.
- Rotary engine. F Brackemann.
- Rotary steam engine. C V Divan, Fils.
- Saddle, harness. C M Lemke.
- Safe lock. A G Burton and D S Covert.
- Safe lock. G L Damon.
- Safe locking mechanism. C O Yale.
- Sash cord fastener. L H Mullikin.
- Sash lock, lifter, and holder. R Guy and O E Reed.
- Seaming machine, can. J W Roberts.
- Seat. O L Barrett.

Seed, machine for cleaning cotton or other.
M Moran.
Sewing machine 2. P Gohring.
Sewing machine for fringing fabrics. G A
Judson.
Sewing machine shuttle. H A Bates.
Shade holder, window. A B Dunkle.
Shaft holder, vehicle. P J Harrah.
Shell. R A Radfield.
Shoe. E L Godling.
Shut off device, pipe. J F Nelson.
Side light. C Anderson.
Signal operating wires, compensator for. J
S Lyman.
Signaling system and apparatus, electric
line. W A Purcell.
Skirt and trousers, combined. B Zeller and
H Cragor.
Sled. J Hofer.
Sleigh runner attachment. H J Howard.
Smoke stacks, device for increasing draft in.
R Gaul.
Soap lye, recovering products from spent. J
Van Rynbeke.
Soldering machine, can. J W Roberts.

Soldering tool, electric. J F McLaughlin.
Sole cutting machine. J J Heys.
Sole rounding machine. J N Moulton.
Sound conducting apparatus. G A Leech.
Stamp, return postage. R S Williams.
Steam, apparatus for preparing expanded
and reheated. F L Dyer.
Steam boiler. H S Barth.
Steam boiler. T Miller.
Steam boiler. F Prox.
Steam boiler, water tube. L D Davis.
Steam boiler, water tube. J W Van Dyke.
Steam engine for air pumps. H Krenz.
Steam, preparing. J Van Rynbeke.
Steam trap. C W Nason.
Steam trap and feeder. D L Long.
Steel, manufacture of. B Talbot.
Stilt. E Piepenbring.
Stitch separating and indenting machine. J
B Hadaway.
Stove. M Jahn.
Stove, heating oil. V E Randall.
Stove or range. J Spear.
Stovepipe attachment. J H Hindress.
Stovepipe joint. F R Brauman.

Strap fastener. F L Moore.
Street sweeper. P B Donahoo.
Stringed instrument bridge. A Graham.
Submarine boat. D T Freese and J D Gawn.
Sulky. S Elliott.
Sulky, pneumatic. G W Clarke.
Switch operating device. W F Dermody.
Switch operating mechanism, automatic. C
P Bachelder.
Tallurian. G B Nichols.
Textile machinery apron. J H Lorimer.
Thermal alarm. H F Maxim.
Trashing machine grain carrier and regula-
tor. A G Green.
Tile for floor and ceiling construction. J
Seipel.
Tile presses, automatic valve gear for. H E
Banker.
Timer's shears. A P Darone.
Tire, bicycle. E M Ballantine.
Tire bolt wrench. J E Campbell.
Tire fabric, bicycle. G C Moore.
Tire heater. J A Callaway.
Tire, rubber. C K Welch.
Tire tightener. E W Hays and E A Thuston.

Tobacco pipe cover. A A Percy.
Toboggan slide. E J Morris.
Tool handle. J W S Neal.
Tool holder. L H Schmitt.
Tool holder. J E Smith.
Torpedo boat, submarine. J P Holland.
Traction engine. C Quast.
Trammel. W H Gates.
Transplanter, tree or flower. H Baldrige.
Trolley stand. E F A Heastings.
Trolley wire hanger. T J McTighe.
Truck, railway car. N C Bassett.
Trunk, bureau, and writing table, combina-
tion. S T Andrus.
Trunk corner and hinge piece. G F Pottle.
Trunk, portmanteau, etc. E Bronsden.
Tubular casings, machine for making. E M
Harrington.
Turbine, steam. C G P de Laval.
Tuyere. J G Habelt.
Type writing cabinet 2. L S Hayes.
Type writing machine, cleaning attachment
for. C T Thatcher.
Umbrella rib locking device 2. F W T
Jedeck.

Umbrella, self closing. J H Sprague.
Vacuum pan. C W Cooper.
Valve, air brake. J F Voorhees.
Valve for water, steam, or other liquids or
gases. W Thomson.
Valve mechanism. W B Mason.
Vehicle brake. W T Lineback.
Vending machine. J A and W T Westbay.
Voltaic battery. H Timm.
Watch, stem winding. G S Klein.
Water closet bowl and seat. G F Greene.
Water closet seat. U G Johnson.
Water heater or boiler. C T Toulmin.
Water heating apparatus 2. C H Page, Jr.
Water motor. A A Rambold.
Water, purifying. B Remmers.
Wheel rim and making same. C F Cowdrey.
Wool, apparatus for extracting oil from. F
N Turney.
Wool washing machine 2. D H Rice.
Wool washing machine. F G Sargent.

Claimants **WHO CAN NOT** hear from
their At-**torneys** or
the Commissioner of Pensions should
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L. C. WOOD & CO.,
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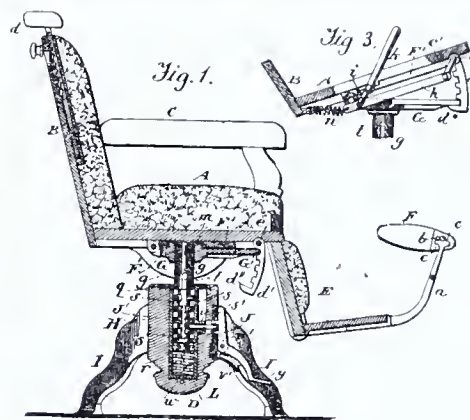
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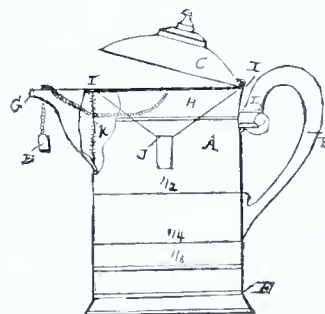
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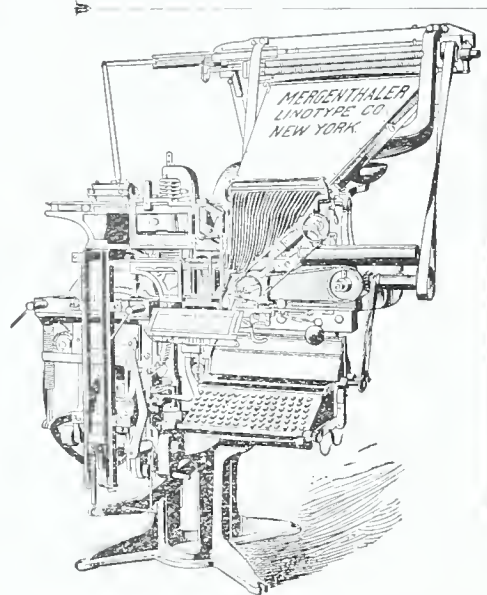
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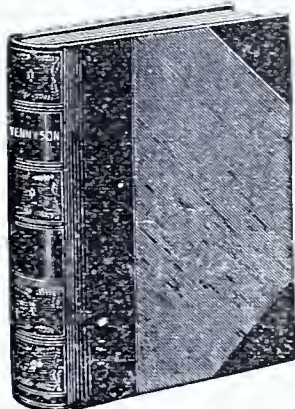
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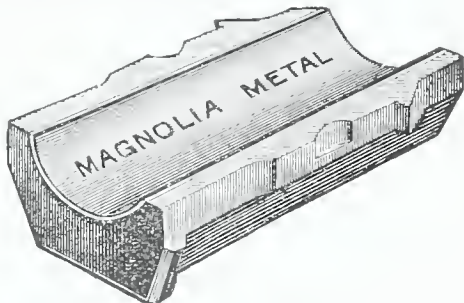
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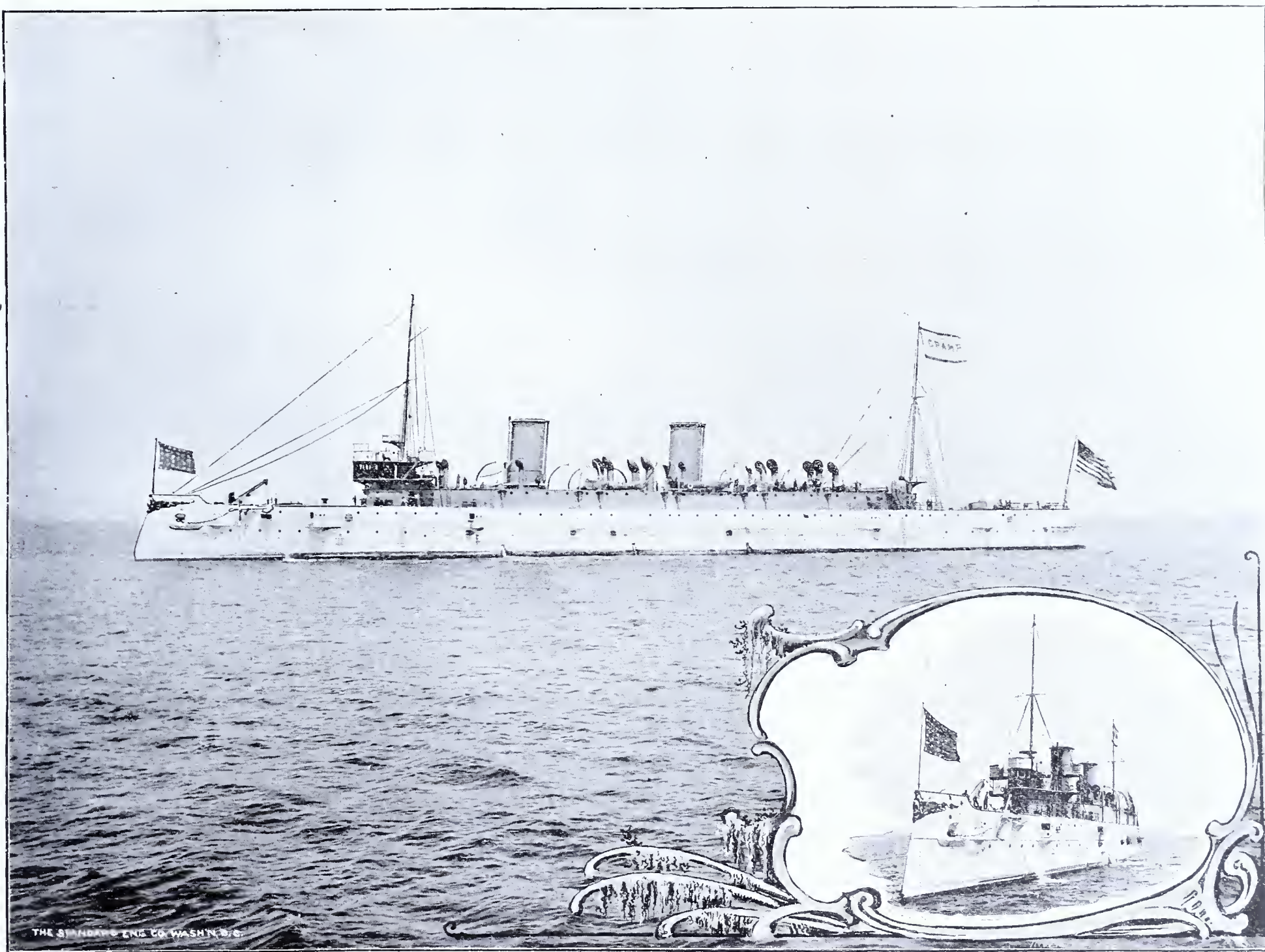
THE CRUISER "MINNEAPOLIS."

The New American "Fighting Machine" the Speediest Warship Afloat.

The modern warship has been characterized by George W. Melville, engineer-in-chief of the United States Navy as a "fighting machine." The new

something over \$400,000. She steamed over the course from Cape Ann to Cape Porpoise and return a distance of about 90 miles, at an average speed of 23.05 knots an hour. During the homeward run she attained the remarkable maximum speed of 25.20 knots. Until the full report of the trial board is published the exact speed of the ship between each

kind occurred. The ship was down to her registered displacement of 7,350 tons and drew 22.7 feet forward, 23.4 feet aft and a mean draft of 22 feet 8½ inches. The average steam pressure was 160 pounds, the total horse power 20,366 and average revolutions of the screws 149 per minute. The principal features of the Minneapolis are as fol-



U. S. CRUISER "MINNEAPOLIS," THE SPEEDIEST WARSHIP AFLOAT, AS SHE APPEARED ON HER TRIAL TRIP.

(From Copyrighted Photograph by Wm. H. Rau, Philadelphia, Pa., 1894.)

cruiser Minneapolis, on her trial trip July 14th demonstrated the fact that not least among her fighting qualifications is that of speed—ability to escape punishment as well as to administer it. She is the fastest warship afloat and her builders, the Cramps, of Philadelphia, will receive as a premium

leg on the course will not be accurately known, but the tidal calculations made by the officials on the stake boats will show an increase of speed, making the official record 23.073 knots instead of 23.05 knots.

On the test trip the Minneapolis is said to have behaved splendidly and no accident of any

kind occurred. She is the second tripple-screw war vessel built in the United States, and has three sets of tripple expansion engines. She is 412 feet long on load line, 58 feet molded beam, mean draft of 22.65 feet; 7,350 tons displacement, and 21,000 indicated

(Continued on page 157.)

The Inventive Age

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WASHINGTON, D. C., AUGUST, 1894.

THE season of 1894 has been so dry throughout the country that the umbrella trust has come to grief. A receiver has been asked for by this novel combine.

THE Ohio legislature passed an act providing for the semi-monthly payment of wages to employees throughout the state. The State Supreme Court has declared the law unconstitutional, as an interference with the right of contract.

IN Denmark nearly all the railroads are owned by the government, and as an indication of their excellent management it is said that in the last 25 years only one person has been killed or injured for each 3,500,000 passengers transported.

THE publication in the Official Gazette, of the United States Patent Office, of the list of expired patents has been discontinued, owing, it is said, to the exhaustion of available funds. The publication of this list is of no great importance, and there will be no general demand for it, even when the funds are available.

LAWS for the vestibuling of street cars have been enacted in several states, and in Minnesota the constitutionality has been decided by the courts. In New York the board of health has taken up the subject of open grip cars and it is not unlikely that within a few years motormen and gripmen in all Northern cities will be protected from the blasts of winter, to which they are now subjected by the use of open cars.

THE work of removing the World's Fair structures, begun by the Columbia Exposition Salvage Company some time ago, was simplified somewhat by the incendiary conflagration of the 5th ult., in which the Terminal, the Administration, Mines and Mining, Electricity, Machinery, Agriculture and Manufacturers' buildings were either wholly or partially destroyed. The famous "Dream City," as some were pleased to call it, now presents the characteristics of a genuine "nightmare."

GREAT national and international expositions have invariably stimulated invention and resulted in the perfection of some great engineering feat or the discovery of a solution to some complex scientific problem. The next great world's exposition will be held in Paris in 1900, and already the exposition commission is at work on a program. In the way of encouragement to genius M. Armengaud, Jr., suggests that in 1900 substantial prizes be offered for three things, viz: seeing at a distance, photography in colors on paper, and electric light without heat. Experiments are now being made along each of these lines, but to offer suitable reward for complete and practical development before the fair of 1900

would be the means of enlisting thousands in the work of discovery and thus make the accomplishment of these much desired results more speedy and certain.

EVERY few days some member of Congress introduces a bill in relation to patents. Nine-tenths of them are so impractical and unreasonably antagonistic to the entire patent system that the friends of genuine reform and improvement in the patent laws are afraid, considering the present temperment of Congress, to advocate or push the passage of any bill, or consider any measure whatever. The latest bill is that introduced in the House by Mr. Duborow, of Illinois, by request, to declare letters patent null and void when used, operated, or controlled by any trust, monopoly, corporation, combination, or other conspiracy in restraint of trade and commerce among the several states or with foreign nations.

THE American consul at Tien Tsin, China, in his last report to this government, calls attention to the fact that the disappearance in 1891 of the old firm of Russell & Co. marked the extinction in China of the last of the great representative American firms and that as a result American imports have decreased, much to the advantage of England, France and Germany. In this connection it is proper to call attention to the fact that during the last three years a wonderful increase of interest in modern manufacturing facilities has manifested itself in China, and there are now being established in that empire the largest steel and cotton mills in the world. The cost of the new steel plant is over \$5,000,000. The day is not far distant when China, with cheap labor coupled with modern genius and modern machinery will make her competition felt throughout the civilized world. The growing tendency towards free trade in this country will stimulate the investment of capital in manufacturing in that part of the world where labor and raw materials are the cheapest, and where the conditions do not point to the elevation of labor to the plane of the American artisan.

As water finds its level, just so sure will the enormous expense incurred in the recent strike eventually be levied and paid by all the people of the United States, no matter how remote from the scenes of bloodshed and lawlessness. Ignoring altogether the case of the Pullman employees against their employer, or admitting the justness of their cause—taking either end of the dilemma—there was no justification for the great strike inaugurated by President Debs of the American Railway Union, and no reason in the demands. Only a misguided regard for the welfare of the laboring man, would in the present depressed condition of manufacturing and business interests, favor enforced idleness upon men who have no grievances, real or fancied. The boycott against the use of Pullman cars was unreasonable and inexcusable, if for no other reason than that it could have no possible bearing upon the real cause espoused by the Pullman employees. It was injudicious and void of sense, because of the fact that through its operation innocent persons were made to suffer without contributing in the least to the settlement of the real trouble at Pullman. To insist that the various railroads shall not run Pullman cars, is to insist on the breaking of contracts as inviolable as any contemplated by the Constitution and Laws of our land. The destruction of a Pullman car by lawless strikers incurs no expense to the Pullman Company. The expense is finally taxed against the community, and every tax-payer must pay his share of it. The laboring classes will feel the effects of the strike more keenly than the business or financial world, because less prepared for it. To force thousands of honest laboring men, who have no grievances, out of employment at this time, when, through natural agencies and universal depression thousands are unable to procure employment at any price, is a crime for which Mr. Debs cannot atone. In counting up the expense of the strike, it will be difficult to estimate the loss in wages and business. The direct losses—destroyed property, damaged merchandise, delays of transpor-

tation, etc., is estimated to exceed \$5,000,000, and there are no substantial benefits to offset unless it be the experience of laboring men, and the teaching of the lesson that the control of labor organizations must be conservative and just, and that mere exercise of power is not necessarily an evidence of wisdom. Possibly another beneficial effect of the strike will be the strengthening of the sentiment in favor of some legislation looking to the encouragement of arbitration in all disagreements between capital and labor, which under perfect adjustment would do away with strikes altogether.

Sadi Carnot the Scientist.

The assassination of Sadi Carnot, the president of the French republic, recalls the short but brilliant life of the uncle for whom he was named, and of whose merits the world knows too little. Sadi Carnot was the son of the General Carnot who won fame both as a soldier and revolutionary leader and as one of the creators of that most beautiful and useful branch of mathematics, projective geometry. Born in 1796, he entered the Excole Polytechnique in 1812 and the engineer corps two years later. He afterwards became a captain in the staff corps, from which he resigned in 1828 on account of bad health, and in 1832 he died of cholera. The last few years of his life were devoted to scientific studies. In 1824 he published a short essay—"Reflexions sur la puissance motrice du fere" (Reflexions on the motive power of heat), which attracted very little attention for many years. In this work he developed the principles upon which the modern science of thermodynamics rest. His perfect reversible engine, while purely an imaginary machine, is the standard to which we must refer every heat engine, and the study of its theory is the necessary preliminary to that of the steam engine. He showed one thing that some modern inventors might profit by—that, so far as fuel consumption is concerned, all expansive materials are equally efficient in a heat engine. For example, an engine using ether would be no more and no less efficient than one using water, although much less heat is required to vaporize a given quantity of the ether than of the water. In his essay Carnot accepted the idea prevalent at that time, as to the material nature of heat, but in 1848 Sir William Thompson (now Lord Kelvin) pointed out the value of his work, and showed that all his reasoning might, by very slight modification, be made consistent with the idea that heat is a form of energy. That Carnot himself had a decided leaning to the modern view, and also a foreshadowing of the doctrine of the conservation of energy, is clearly shown by some manuscripts left by him and first published by his brother, President Carnot's father, in 1871. Besides noting several methods for obtaining the mechanical equivalent of heat, which were afterwards actually used by Joule, he wrote the following: "Heat is simply motive power (energy), or rather motion which has changed its form. It is a movement of the particles of bodies. Whenever there is destruction of motive power there is at the same time a production of heat in quantity precisely proportional to the amount of motive power destroyed. Reciprocally, whenever there is destruction of heat there is a production of motive power." Thirty years later the world accepted this view. Unappreciated by his own generation, he is now recognized as one of the most profound and original of scientific thinkers.

Need of Expert Testimony in Patent Cases.

We have taken occasion before this to criticize one-sided expert testimony in mechanical matters, especially when it related to patent suits, our ground being that an expert retained *ex parte* would twist facts to favor his client. It seems to be just the same in all other matters. As, for example, some time last year, during the excitement of a political campaign, it was claimed that an official was a defaulter to the county in quite a large sum. An expert accountant was set in the regular way to examine the official's accounts, and he pronounced them quite correct. Not satisfied with this, one of the political parties put an accountant at the job, and he found them all wrong. Then the two parties selected each an expert to make the examination, the result being that one found the accounts wrong and the other found them right. At length the matter having come before a judge, he put the accounts into the hands of a firm of unprejudiced accountants and everything was found to be as it should be. Now, it has always been our contention that in patent cases the court should put an expert at work on the case instead of leaving it to be misrepresented in every possible way by opposing experts, and the case just cited seems to fortify our position.—*American Machinist*.

NOTES AND NEWS.

Most Powerful Light in the World.—The new electric light to be placed in the Fire Island lighthouse, off New York, will have the power of 450,000,000 candles.

* * *

The New Gunboats.—Work on the three new gunboats at Newport News is progressing rapidly. They will be named respectively the "Albatross," the "Penguin" and the "Porpoise."

* * *

Mahogany Pavement.—As an experiment genuine Brazilian mahogany is being used for street paving on a portion of Rue Lafayette, Paris. The expense is about \$10 per square yard.

* * *

Largest Cut Stones in the World.—The largest cut stones in the world are in the Temple of the Sun at Baalbec. Many are more than sixty feet long, twenty feet broad and of unknown depth.

* * *

American Railway Mileage.—It is shown by the Sixth Annual Report of the Interstate Commerce Commission that the railway mileage in the United States on June 30, 1894, was 176,461 miles, an increase of 4,897 miles during the last year.

* * *

Fastest Torpedo Boat in the World.—The record of 28 knots an hour, made by the "Hornet," has been eclipsed by the new English destroyer, the "Daring," which has developed a speed of 29½ knots. This is the highest record ever made by any vessel.

* * *

The Sun's Heat.—Additional evidence on the subject of the supposed heat from the sun's rays is furnished by an experiment recently reported in France. A balloon, with registering instruments, was sent up a distance of ten miles above the earth's surface, where the temperature registered was found to be 104 deg. Fahr.

* * *

Paper Telegraph Poles.—One of the latest uses to which paper pulp is being put is that of making telegraph poles. Borax, tallow and a few other ingredients are mixed with the pulp and it is cast in a mould with a core in the center. The experiment is said to have been a complete success, and it is believed that paper poles are destined to take the place of wooden poles in districts far removed from timber.

* * *

Early Greek Water Works.—The early Greeks depended upon natural springs and cisterns hewn in the rock, but the insufficiency of the supply led to daring engineering works. As early as 625 B. C. a tunnel, 4200 feet long, 8 feet broad and 8 feet high was cut through a hill which stood between Samos and a coveted supply of water. Fifty or sixty years later extensive works of a similar nature were constructed to bring water to Athens from the hills of Hymettus, Pentelicus and Parnes. Some of the ancient aqueducts continue to supply Athens at the present time.

* * *

Duel Regulations in Russia.—According to the new army regulation in Russia, disputes between officers are to be settled by duels, but not until a Court of Honor shall have passed upon the question whether a duel is unavoidable or not. Should the decision be in the affirmative, any officer declining to accept the challenge will be dismissed from the service. A report upon duels between officers is in future to be made to the Minister of War, who, in concert with the Minister of Justice, may appeal to the Emperor to stop any legal proceedings resulting from the hostile encounter.

* * *

Does Electrocution Really Kill?—Dr. d'Arsonval, in a communication to the Paris Academy of Sciences, states that death from the electric current is like that in drowning, and is often only apparent; in such cases the treatment should, therefore, be like in case of drowning; he believes that the criminals executed electrically in New York are really alive, and die only in the absence of restoratives. He cites the case of a workman in St. Denis who was subjected to 4,500 volts, and was restored to consciousness in a short time, although he had been left three-quarters of an hour under the supposition that he was dead. He was restored by artificial respiration.

* * *

Effect of Tea and Coffee on Digestion.—A German physiologist, Schultz-Schultzenstein, subjected chopped boiled eggs to artificial digestion

with hydrochloric acid, adding in different cases pure water, tea and coffee. The percentage of albumen digested by the pure acid was 94, with the water 92, with the tea 66, and with the coffee 61. Thus the addition of pure water affected the digestion little, but the tea and coffee lessened it very materially. In this experiment the egg was chopped into millimeter cubes. In a previous trial, in which the egg was not chopped so fine, the presence of tea and coffee was even more unfavorable.—*Zeitschrift für physiologische Chemie.*

* * *

Wild Camels.—It has been maintained by many that there existed no specimens of the camel in the wild state, but a St. Petersburg correspondent disputes this and says: "The Chief of the Expedition of the Russian Geographical Society to Central Asia, under M. Kozloff, has telegraphed to the Natural History Museum of St. Petersburg that on the route between Lob-Nor and Sa-jei the wild camel was met with in considerable numbers. M. Kozloff contented himself with shooting six specimens, and, besides the skins and skulls, he is bringing with him one complete skeleton. I believe that at present the museums of London and St. Petersburg are the only possessors of specimens of the wild camel, which, except in the marshes of Southern Spain, where it is merely a descendant of tame ones run wild, was pretty generally considered as extinct as the bison."

* * *

Center of Population.—In 1790 the center of population in the United States was at a point 23 miles east of Baltimore. During the first ten year period it moved 41 miles westward to a point 18 miles west of Baltimore. During the next period it moved 36 miles to a point 43 miles northwest by west of Washington. In 1820 it was 16 miles north of Woodstock, Va., having moved westward 50 miles in ten years. From 1820 to 1830, 39 miles, 19 miles southwest of Moorefield, W. Va. From 1830 to 1840, 55 miles, 16 miles south of Clarksburg, W. Va. From 1840 to 1850, 55 miles, 23 miles southeast of Parkersburg, W. Va. From 1850 to 1860, 81 miles, 20 miles south of Chillicothe, Ohio. From 1860 to 1870, 42 miles, 48 miles east by north of Cincinnati, Ohio. From 1870 to 1880, 58 miles, 8 miles west by south of Cincinnati. From 1880 to 1890, 48 miles, 20 miles east of Columbus, Ohio. It will be noticed that the greatest western jump was the period following the war, when the rush began for new homes in the great West under the homestead laws.

* * *

The Hudson River Bridge.—This great undertaking, according to the terms of the bill recently approved by the President, must be completed within 10 years. The bridge will be a suspended cantilever bridge, and will cost, including approaches, in the neighborhood of \$40,000,000. Its promoters say it probably will be completed in four years. At the center it will be 15 feet higher than the Brooklyn Bridge. The bridge will be purely a railway bridge, with six tracks, for trains of all the railroad systems now terminating on the Jersey shore. It has been reckoned that 790 trains can pass over the bridge in a day. This project looks toward the erection of a union station on the west side to provide a terminus for all these railroads. According to the company's plans, it is proposed to take two city blocks, each 200x800 feet, and bounded by Forty-second, Forty-third and Forty-seventh streets, by Seventh avenue and Broadway and Eighth avenue, giving an area of nearly four acres. The bridge over the Hudson river will be connected with the station at Broadway and Forty-second street by a steel viaduct, the average height of which will be 60 feet, and the total length about 10,680 feet.

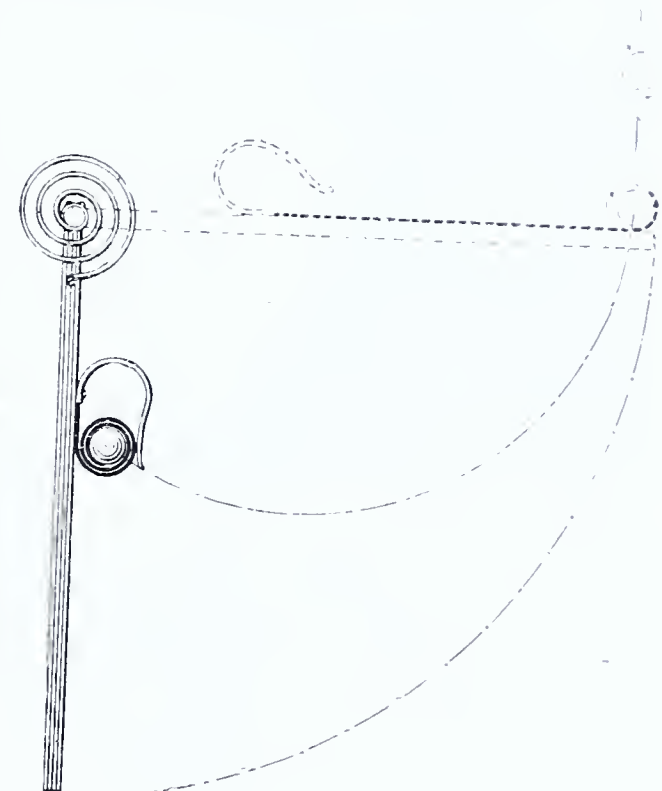
That Patent Office Bar.

To the discussion now going on in respect to the suggestion of the Commissioner of Patents that those acting as patent agents should be qualified to practice in the Circuit Court, we have but one remark to offer, says "Industry," and that is that the Commissioner of Patents has certainly not considered, or taken into account, that among those admitted to practice in the Federal Courts not one in ten is trusted with the conduct of patent cases tried in these courts. The draughting of specifications, and dealing with references that may arise in procedure, may, in a sense, but only in a limited sense, involve problems of law, and these when required are very fully "taken care of" by the officers of the Bureau. Procedure in patent soliciting is a technical pursuit that should be coupled with a control of language, and understanding of the arts, and an acquaintance with the brief and simple laws relating to letters patent. Court procedure is quite another thing. There is no objection to a patent agent being a lawyer, but how he is to learn the law and also the much wider field of construction and technical art is a problem.

A MINER'S inch of water is equal to 9 gallons per minute.

Device for Throwing a "Curve" Ball.

The INVENTIVE AGE, at the suggestion of Mr. C. S. Booth, of Camp Point, Ills., throws out the suggestion to some inventive genius, or base ball "crank," of an automatic device for throwing a "curve" ball. It is simply an idea that might be elaborated and taken advantage of by some one through the Patent Office. The scheme is shown in the accompanying illustration. Pivot one end of a lever, in the most convenient fashion, to the planet so that the lever will be swung on the pivot in a horizontal plane by a strong spring, or possibly it would be as well to make one end of a coil fast to a base and then make one end of the lever fast to the free end of the spring. Attach one end of a strap, of a width approximating to the diameter of the ball, adjustably to the lever at a point between the ends of the lever. Beginning at the outer end of the strap, wrap the ball in the strap and hold the ball in the wrapped position by the pressure of a light spring. Then draw back the lever against the driv-



ing spring and let fly. The centrifugal force will throw the ball from its set position to the outer end of the lever, and the unrolling of the ball from the strap will give it a motion on its own axis—which motion produces the curve. The traveling speed of the ball will be that of the outer end of the lever. Now if the strap is set to project beyond the end of the lever, the ball will leave the lever before it does the strap, and the strap will make a goodbye pull on the ball and give it an increased whirl on its axis, but the ball will not be thrown so far as if the strap did not so project.

It is believed that a mechanism of this kind can be perfected and adjusted so nicely that the operator (the pitcher) can send a ball with unerring uniformity in the direction he desires it to go and with a curve and force such as he may deem the situation of the game requires.

Unprecedented Hoarding of Gold.

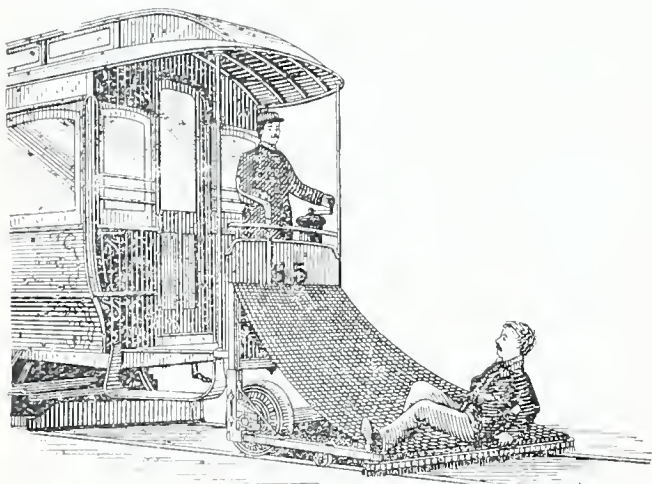
A writer in the Pall Mall Gazette, of London, calls attention to the enormous accumulation of gold in that financial center, the total amount of gold now in the Bank of England being nearly \$200,000,000, a sum unprecedented in the history of that institution. Referring to this fact this writer states that, as after 1857 and 1866, the Bank of England "is once more watching for the time when the mighty torrent of gold will again burst the dam and cause a general and rapid improvement in the value of securities." People, says he, must have something for their money, and the question soon must be, who is going to set the example for going in for the purchase of second, third and fourth-rate investments? "In times gone by the same process has always been gone through, and it must inevitably be gone through again. At the present time there are some thousand million sterling of money, or \$5,000,000,000, lying on deposit with the London banks, and hardly any of the depositors dare to move their portion into securities that are not gilt-edged."

DR. V. HARLEY, by experiments upon himself, has found that sugar is a great muscle food. When fasting 17½ ounces increased his working power from 61 to 76 per cent.

THE new city directory of Chicago gives an estimated population of 1,700,000 to the Windy City.

The Gilliam Hypotenuse Railway Fender.

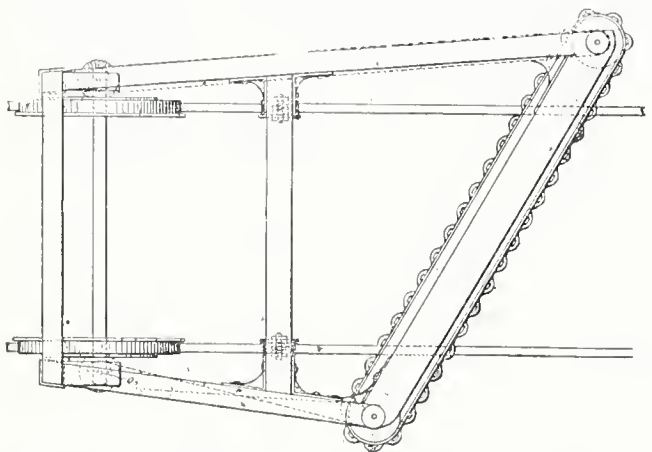
Mr. J. W. T. Gilliam, of Baltimore, is the inventor of a car fender combining many new and novel features. Mr. Gilliam is a skillful mechanic and an inventor of some note. In considering the question of suitable life or safety guards for street cars Mr. Gilliam first took into account all the conditions likely to surround their use. While he appreciated the objections that might be raised to a projecting fender, still he realized the fact that the only object of a fender was to save life and limbs, and, therefore, must be automatic and unerring in its operation. The Gilliam fender consists of a projecting framework, about three feet on the right side of the car and five or six feet on the left side, making an angle on hypotenuse line 45° more or less as desired. The fender is supported by wheels running upon the rails in front of the car and sustaining the buffer at a uniform distance of two and a half inches above



THE GILLIAM CAR FENDER.

the track at all times. Upon the front end of the framework is placed a belt or sprocket chain with gum buffers, which rotates across the track automatically with the movement of the car. The belt or sprocket chain can be made from $3\frac{1}{2}$ to 6 inches wide and will lift from 700 to 3,500 pounds easily. Two inches above and three inches to the rear of the belt is fastened a net which hangs in convex shape. The operation of the fender is such that in striking a person it will first carry his feet laterally from under him, thus obviating the liability, as with the majority of fenders now in use, of the feet being turned under the fender edge and the ankles being sprained or broken. After being tripped by the revolving buffer the person struck falls into a net the arrangement of which will cause him to be shifted to one side of the car out of danger. It differs from other fenders in that it can instantly be uncoupled from one car and attached to another, which is done by coupling pin.

Mr. Gilliam enumerates many objections to the present car fenders that are overcome in his invention. First. All fenders that are attached to the car proper, either to the sides or trucks, will raise up in



front when going down grade, in which position they could not be depended upon. Second. When a person has been knocked down by fenders in present use his arm, leg or clothing are liable to get caught and serious results follow before he could be extricated. Third. It is claimed that the inventors of all other fenders have failed to take into account the severity of winter storms in northern cities and that snow and ice would interfere with their successful working. Another point is that a trip or spring fender is not to be relied upon because when going at rapid speed the action is not quick enough and not at all certain in its movements. Fourth. The Gilliam fender can be speedily detached from one car and attached to another in the street if desired, as all parts are made detachable and simple.

Many of the fenders recently patented cannot be attached to street cars now in use without remodel-

ing the cars somewhat. It is claimed for the Gilliam fender that it can be attached to any car now in use. Another objection to fenders attached to the frame of the car without independent support wheels is that when no load is on the car the fender is elevated too far from the track, and when a load is on the car the fender is frequently too low to pass over ordinary street pavement projections. It is claimed by the inventor that the Gilliam fender will hold its level at all times and under all circumstances.

An ideal fender is one that is ever ready, under all circumstances, to perform the work for which it is designed.

The Gilliam fender is designed for all kinds of weather and all conditions of track. It is calculated to always maintain its position close to the track, and not only save life but save limb as well. The person struck by it will either be pushed off the track or tripped into a net where he is out of danger. It is a fender that can also be applied to steam locomotives.

The Austro-Hungarian Patent Law.

This law, as published in the Official Gazette of July 3rd, was elaborated with great care and adopted by the parliaments of both countries in view of a modification of their customs and commercial compact. A statement of its substance was published in *La Propriete Industrielle*, January 1894, from which I abridge as follows:

1. Patents heretofore applied for or granted shall be valid in both countries for the remainder of their term, except as they may be affected by future legislation.

Extensions and declarations of invalidity are to be made by agreement between the Ministers of Commerce of the two countries, taxes and fees to be paid remaining unchanged.

If the Minister of Commerce of one part of the Empire shall not consent to an extension, the patent shall be void as to that part. The same shall be the case regarding declarations of invalidity. A patent shall be invalid for that part of the Empire where it is so pronounced, and may remain in force in the other part.

All other questions are to be considered in common by the two Ministers of Commerce.

2. In applications filed after January 1894, the applicant may demand protection either in Austria alone, or in Hungary alone, or in both, and shall deposit his applications accordingly: to-wit, with the Austrian Minister of Commerce, with the Hungarian Minister of Commerce, or a separate application with each.

Applications for patent shall be made under the laws now in force until new legislation is enacted.

The invention must be worked in that part of the Empire in which it is protected. If protected in both parts then working must take place in both.

When the inventor desires to protect his invention in both parts of the Empire, he is not required to file his applications simultaneously in both; but by filing in one acquires a right of priority in the other for ninety days from the date of delivery of the patent.

* * *

A digest of the existing laws of Austro-Hungary was published in the Official Gazette, August 26, 1873, and republished January 16, 1883. By that law the inventor was obliged to take two patents, which were, however, granted on a single application. The present scheme is in the line of administrative separation between the two parts of the Empire to which the tendency has been manifest for half a century. It is therefore not to be regarded so much as a new patent law as an international compact in regard to patents.

F. A. SEELY.

Success of the British Yacht.

Commenting on the defeat of the *Vigilant*, "Seaboard" says: "Six consecutive defeats of the *Vigilant* by the *Britannia* pretty conclusively proves that the latter is the better boat. We may as well own up to this now, as at any other time. And we may as well compliment the British on the improvements in yacht construction that they have made in the last forty years or so, however slow their growth has been. This much has been learned by the *Vigilant's* defeat: That to win in British water, American yachts must be so built as to tack quicker, and they must be able to gather their way more speedily after tacking. These are the two points wherein the *Britannia* has so far shown her superiority.

Progress of Railway Building in Australia.

A recent consul report shows that Australia has one mile of railway to each 344 inhabitants as against 1,888 in Great Britain and 350 in the United States. The railways in all the colonies, with the exception of one or two lines, belong to the state, and the management is said to be highly satisfactory to the people.

THE CRUISER "MINNEAPOLIS."

(Continued from first page.)

horse power. Another feature of the *Minneapolis*, different from her sister ship, the *Columbia*, is that her coal capacity is 2,200 tons, while that of the *Columbia* is but 2,000. If the *Columbia* were pushed to her utmost, for three consecutive days, she would consume all the coal in her bunkers, whereas the *Minneapolis* could keep it up for almost five days. The cruising speed of these vessels is ten knots an hour, at which the *Columbia's* coal would last her for 103 days and the *Minneapolis* in proportion. There are three manganese bronze screws, each driven by a separate triple expansion engine, designed by the Bureau of Steam Engineering. The engines have cylinders 42 inches, 59 inches and 92 inches diameter, and 42 inches stroke, and the maximum steam pressure is designed to be 165 pounds. Each engine is in a separate water tight compartment and is absolutely independent of the others. The side propellers are 15 feet in diameter and are three feet above and 14 feet forward of the middle propeller, which is slightly smaller than the twin screws. The diameter of the middle screw is 14 feet. The pitch of each propeller is 21 feet. All are three bladed and are of manganese bronze. There are eight double ended return tube boilers. These are $15\frac{3}{4}$ feet in diameter and 20 feet in length.

The coal used on the trial trip of the *Minneapolis* had all been carefully picked over by hand, lump by lump, and not a little of the success was due to the expertness of the 63 firemen required to feed the furnaces.

The vessel will now take on her armament which while not heavy will not lack in efficiency to combat vessels of her class. Her unexcelled speed makes her master of the situation. It exceeds that of the swiftest ocean greyhound, and when out-classed by armored vessels she can easily get beyond their reach. Her armament will consist of two 6 inch rifles, mounted forward; one 8 inch rifle, mounted on a pivot carriage aft, and eight 4 inch rapid fire guns. In the secondary battery will be 12 6-pounder rapid fire cannon, four 1-pounders, and four Gatlings. The vessel has also been fitted with five torpedo tubes. There is one on each bow and quarter, and one fitted in the stern.

The success of the *Minneapolis* following so closely on that of her sister ship, the *Columbia*, is a pleasing evidence of the skill of American ship-builders and the coming supremacy of the American navy.

The illustrations accompanying this sketch are made from photographs taken for THE INVENTIVE AGE and copyrighted by William H. Rau, Philadelphia.

The Right of an Inventor to a Patent.

"A patent right. To charge eighteen times what a thing is worth."

Thus the term, "a patent right," is defined by Puck, and many people will smile over it and believe it to be an accurate definition, says American Machinist. But it is not accurate simply because no one can be compelled to pay anything whatever for a patented article. Anyone who chooses can go right on doing without the patented thing just as he did before it was invented, and he will do so unless convinced that the patented thing is worth more to him than the price asked for it.

It should not be forgotten that a real patent is simply a right to the exclusive control for a limited time of a thing actually created by the inventor—a thing in the possession of which he should be just as much protected as in the possession of a table or of a machine which he has made. A man by working two days produces a table, and when it is done it ought to be his to dispose of as he likes. If he has no use for it himself he may want to sell it, and if he does he has the privilege of charging what he likes for it, under penalty of having it left useless on his hands if he charges more than it is worth. A man who works a year or more, perhaps, studying, experimenting and working, produces a machine which will accomplish things not before possible of accomplishment. If these things are not desirable to others then nothing will be paid for their accomplishment nor for the machine, and the inventor will be unpaid.

We are free to admit that some abuses have grown up under the patent laws and it is well understood among patent lawyers that these abuses could be prevented by amendments plainly needed, and which would probably be made were it not for the fact that the friends of our patent system fear to bring up the matter of a general revision of the patent laws, because they think that the prevalent and unreasoning opposition to all patents, bred by the few monopolies that abuse their privilege under them, will result in injury rather than improvement.

TWO-THIRDS of the fruits of the world is grown on irrigated land.—*Irrigation Age*.

Similarities in Culture and Invention.

The Patent Examiner and attorney are ever busied with and puzzled by the word "similarities," so is the ethnologist—the former, in order that he may reject patents, the latter that he may know who was the real inventor. Indeed the ethnologists are to-day divided into two camps on this issue. Some say that whenever you discover two implements or processes alike on different continents or far removed, natural causes account for the likeness. The other camp say *similia similibus causantur*—likeness in effect means identity of cause. The truth is some where between the extremes.

In this study of similarities we may be allowed to look at definitions and motives. Things may be similar because:

1. Made by the same artisan at the same time; example, two arrows for the same quiver, two woven pieces for the same set.

2. The same artisan at different times; example, two quivers of arrows or two pieces of pottery from the same hand. Collections of the works of the same distinguished artisan or artist are highly prized.

3. Made by the same family, clan, guild or other social group in the same period or different periods.

4. Made by the pupils of any of the above mentioned in other parts of the world. English or French smiths working among the fur trading Indians.

5. Made by people of different race from their teachers at the home of the former. This teaching may be in many ways, but Powell calls them all "acculturation." The Eskimo and Indians engraving native patterns on native art objects with European tools are good examples.

6. The work of people having common ancestors, but now widely separated one from the other. This is a mooted question in ethnology and in competition with the next category.

7. Things made by peoples of different blood under stress of

1. A common hope and mental status.

2. A common dread and mental status.

3. Under similar external conditions of material and resources.

4. And similar obstacles and drawbacks.

Now, we are working under the assumption that the human species is one. All men are akin, all tribes of men are akin. A family tree of the tribes and races of mankind might be formed by one sufficiently informed. The question of similarities, therefore, resolves itself into one of degrees of consanguinity among the makers.

The Eskimo throwing stick and the Australian throwing stick are the works of people who are really, though very remotely, akin. If these kindred peoples' common ancestors had some kind of throwing stick before they separated, then we have one way of accounting for the facts, and the theories may be thus set forth:

1. *Traditional similarity.* In this the peoples have been only a little while separated and the natural conditions are not varied.

2. *Modified similarity.* The peoples have traditional similarities, but the environments are changed.

3. *Accultural similarities.* The separation has been sufficiently long or the conditions so varied that the recollection of an art has died out and has been revived by renewed contact with members (a) of the race that did not forget the art, or (b) with some race that preserves it though both of the older ones have lost it.

4. *Instructive similarities.* Both peoples inheriting the common traits, their ancestors having lived together until these traits were set in certain lines of functioning, it is to be expected that under similar exigencies they would effect the same result.

5. *Accidental similarities.* The number of combinations in tools and tool working with material being limited on this earth, we may not be surprised if in regions or times wide apart the same tool or process or industrial product should be hit upon. But with regard to such the axiom may be laid down that the greater the number of similar marks the less the probability of accidental or independent origin. The marimba is a musical instrument of West Africa, but it is found under the same name among the Indians of Central America. There is no doubt that the negroes taught the Indians to make them. For each of these there is a separate definition for the word similarity.

1. A traditional similarity amounts to identity. The things will be alike often in spite of material or motive.

2. Modified similarities are changes in structure or function clearly due to external pressure or material.

3. Accultural similarities are only loans and are usually detected by their association with foreign methods of using or foreign fundamental principles or parts.

4. Instinctive similarities are in the general plan and function, but they do not resemble at all in the minute of structure nor in the methods of functioning.

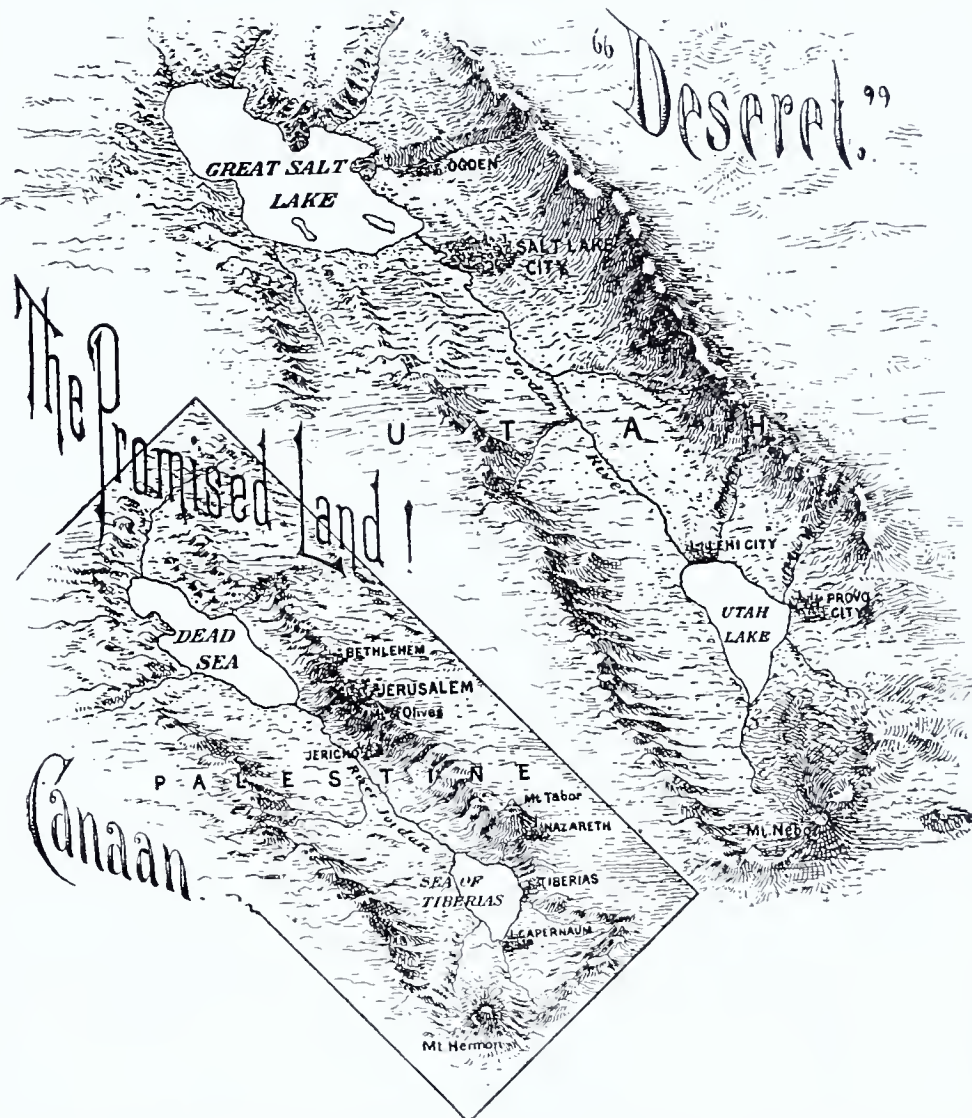
5. Accidental similarities are still more general in their character. These have always arrested the attention of students who are affected by first impressions and they have led to much confusion in science.

O. T. MASON.

The New Monitor "Terror."

The construction of the new coast defense warship *Terror*, at the Brooklyn navy yard, is progressing so rapidly that it is now confidently expected that she can be added to the active fighting force of the navy in about ninety days. The *Terror*, when completed, can float amid the shots of the world's greatest ironclads. Of much the same type as the *Miantonomah*, the *Terror* is much better provided with armor, and her heavy guns will keep any enemy at a long distance from her. She is a double-turreted monitor, 250 feet in length, 53 feet beam, 14 feet draught, and 3,815 tons displacement. There will be two 10-inch breech loading rifled guns mounted in each of the two turrets.

The turret equipments, which are now in place, are a novelty in modern naval construction. Each



turret consists of five heavy armor plates. Four of these are 11½ inches in thickness, while the fifth, that through which the muzzles of the guns protrude, is 12½ inches thick. The plates are of Harveyized nickel-steel from the works of the Bethlehem Iron Company.

The plates are set to form a circular turret, having an inside diameter of 22 feet 5¾ inches. The height of each plate is 6 feet 3 inches. The roof of each turret will be a low, flat-like cone, 7 feet 2 inches high in the center. The turrets rest upon circular base plates and revolve with their guns, so that the latter can be brought to bear on an enemy in any direction. The plates for the two turrets weigh 438,000 pounds, or 219 tons, and cost the government \$170,000.

The New Promised Land.

The accompanying map of Canaan and the Salt Lake valley strikingly exhibits the topographical similarity between the Promised Land of the Bible times and the Promised Land to which Brigham Young led the Mormon pioneers of 1847. In both localities a River Jordan connects a body of fresh water with a Dead sea, and the surrounding mountain landscape is almost the same in both cases. How much this strange likeness may have appealed to the imagination of the Latter-day Saints it is not easy to say, but it is by no means difficult to understand how even a sentiment might take very firm hold of a people's mind, especially a people having just such an historical environment as the Mormons.—*Irrigation Age*.

The Right of Invention.

A prominent American inventor who has been a long while producing a machine which should, if completed, very successfully rival those now in the market, and which latter are making fortunes for their manufacturer, wishes to sell "the right of invention" of his device, for the various countries in Europe, for a sum in cash.

I find it almost impossible to eliminate from the minds of inventors that capitalists, especially in Europe, will not put cash up against wind or probabilities; and this complaint of regarding an unfinished and unknown invention as a merchantable commodity which the great capitalists of the moneyed centers of the world are lying in wait to grasp is as wide-spread as it is hard to cure. I want to save the time lost by inventors and of capitalists by calling the attention of the former to what the latter demand when access to them has been had and their interest enlisted in something which promises well.

In the first place they want to know who you are and who introduces or recommends you. From electrical sugar refining up and down, capitalists have been taken in by plausible inventors or self-styled inventors, who are nothing but frauds and adventurers. In Europe you can hardly stir a foot without good letters of introduction. People here are much more suspicious than in America.

In the second place, the question arises: Is the invention patented? If not, is it completed and ready to patent? Or, putting it the other way—is it completed? If not, is it patented ready to be developed mechanically or chemically? An idea that is neither patented nor in working shape is not a thing, it is a possibility, and when you want to sell a man an option you must at least give him that option on some definite thing.

Third. If completed, has the invention been tested by competent persons of known probity, and reported on favorably by them? This done, the capitalist is usually desirous of submitting the matter to his own personal information, or of testing it himself, if he is capable of judging.

Fourth. Is the patent still valid? In many European countries a patent must be "kept alive" by payment of annual taxes, and "exploited" within a given time—else it is of no value.

"Exploitation" consists in adopting and exhausting all reasonable and available means to put the invention in practical shape within the time specified and getting that fact certified to in detail and the certificate properly recorded.

Fifth. Has the patent been broken by the introduction into the country of articles made under it in another country with which there are no special arrangements? Thus if a thing is patented in France and the inventor introduces it from Germany, the patent falls; but English-made, or Belgian-made samples, or commercial articles may be brought into France without breaking the patent.

Brussels, June 30, 1894.

R. GRIMSHAW.

A Novel Illusion.

One of the amusing attractions at Atlantic City this season is called the Mammoth See-Saw. It is the invention of Capt. Amariah Lake, of Pleasantville, N. J., and consists of a room 17x28 feet, nicely decorated and provided with seats for seventy-five persons. Guests seated within seem to be teetering up and down when in reality they do not move at all but are perfectly quiet. The movement of the building is said to be a most interesting and enjoyable illusion.

EDMOND JULIEN, the distinguished engineer and founder of what is known in this country and Europe as the Julien storage battery system, expired at his home in Brussels on the 5th of last month.

SCIENTIFIC IRRIGATION.

Its Wonderful Progress in America and its Benefit to Mankind.

People who live in the humid area of the United States where general and protracted periods of drouth

bed widths of from fifty to seventy feet, and the lengths of the main lines of which are from fifty to one hundred miles, with as many more miles of laterals and distributaries. Such canals will irrigate from one hundred thousand to one hundred and fifty thousand acres each, and will render habitable twice that area, each affording on an average of forty

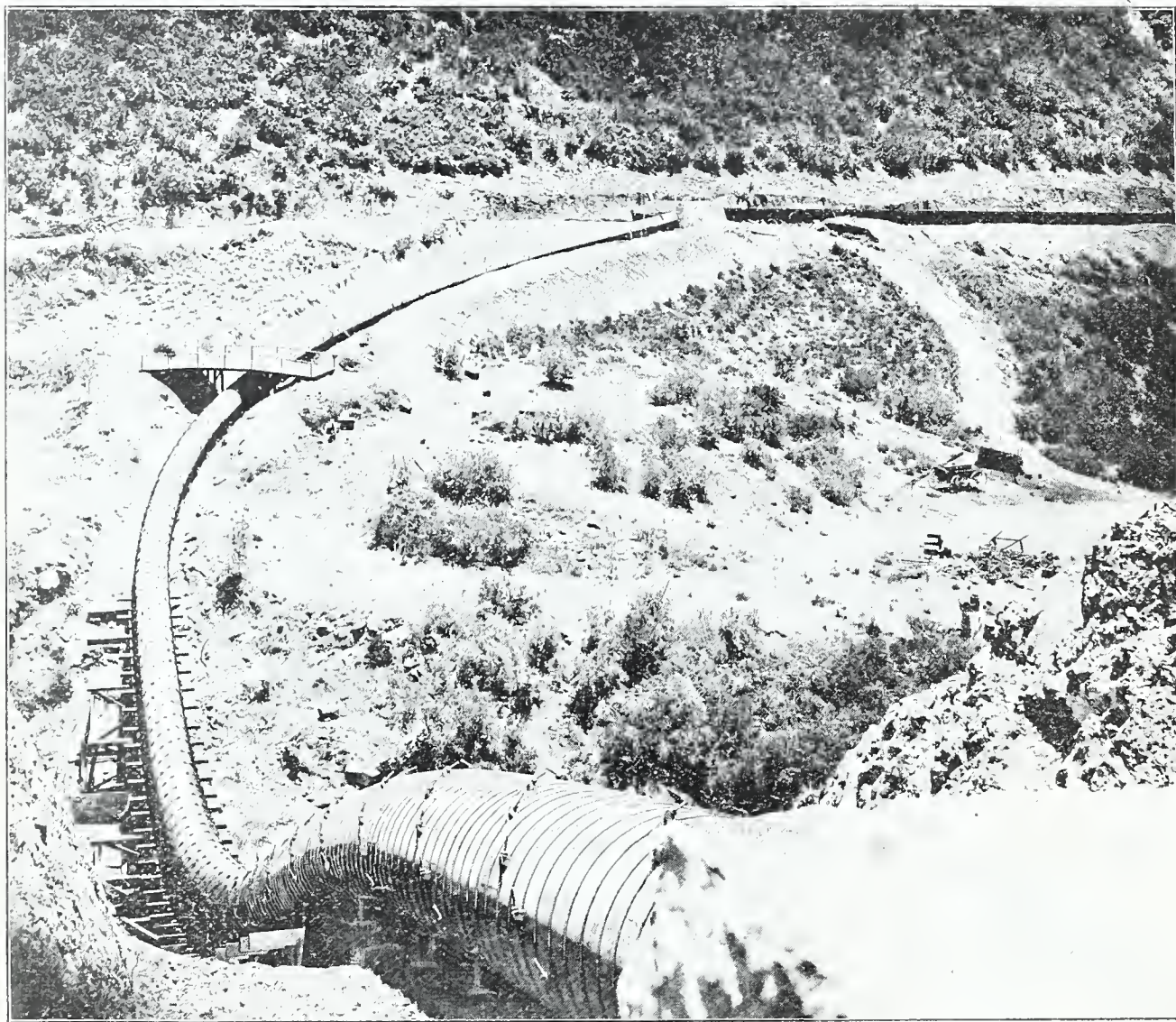
of construction. The area of land commanded by works completed or under construction is second only to that in India, and, excepting the Cavour canal in Italy, there is no work of this kind in Europe which compares in size with our modern canals.

There are six essential points of difference between the irrigation works of this country and those of India. The first relates to ownership and legislation; the second to the character and mode of life of the people who inhabit the two countries; the third to the climatology; the fourth to engineering; the fifth construction; and the sixth and last to superintendence and maintenance.

The first point of difference is dependent chiefly on the fact that in India all land and all water belong to the government, and that the irrigation works are designed, constructed and maintained by the government. In consequence of this the legal questions involved are comparatively few and relate chiefly to the amounts of water to be distributed to consumers and the right of way through improved land. The question of profit is not always paramount, and while the direct money return is often small, the indirect return to the government is always large in enhanced revenue from the rental of land, in immunity from famine (and the consequent heavy drain on the treasury for relief and charity), and in the general benefit to the people resulting from increased resources and exports. While the people of the United States or the general government are benefitted as is the government of India from the last cause, the owner of the irrigation works is not directly, as he is invariably a private individual or a corporation. As the irrigated lands are all under private ownership, and the water the property of the public until appropriated, the owners of irrigation works do not benefit by enhanced land values unless they purchase and own land. The priority of right to appropriate water and the ownership thereof give rise to some of the most troublesome and expensive legal complications with which the Western people have to deal. In this country the laws relating to the ownership of irrigable lands and works, the rights of way have become so voluminous and differ so greatly in the various states as to create one of the most serious impediments to the inception of irrigation enterprises. Direct money profit is essential to any irrigation project in this country, and in our most successful works this profit has as yet been chiefly realized from the sale and ownership of land, the value of which has been increased by furnishing it with a water supply, rather than from the sale of the water developed by the project."

The benefits of irrigation, even in the humid regions of the East, is commented upon by Mr. C. A. Gregory in an article in the same magazine. He says:

"The most important, practical, scientific and



WOODEN PIPE LINE OF BEAR VALLEY IRRIGATION SYSTEM.

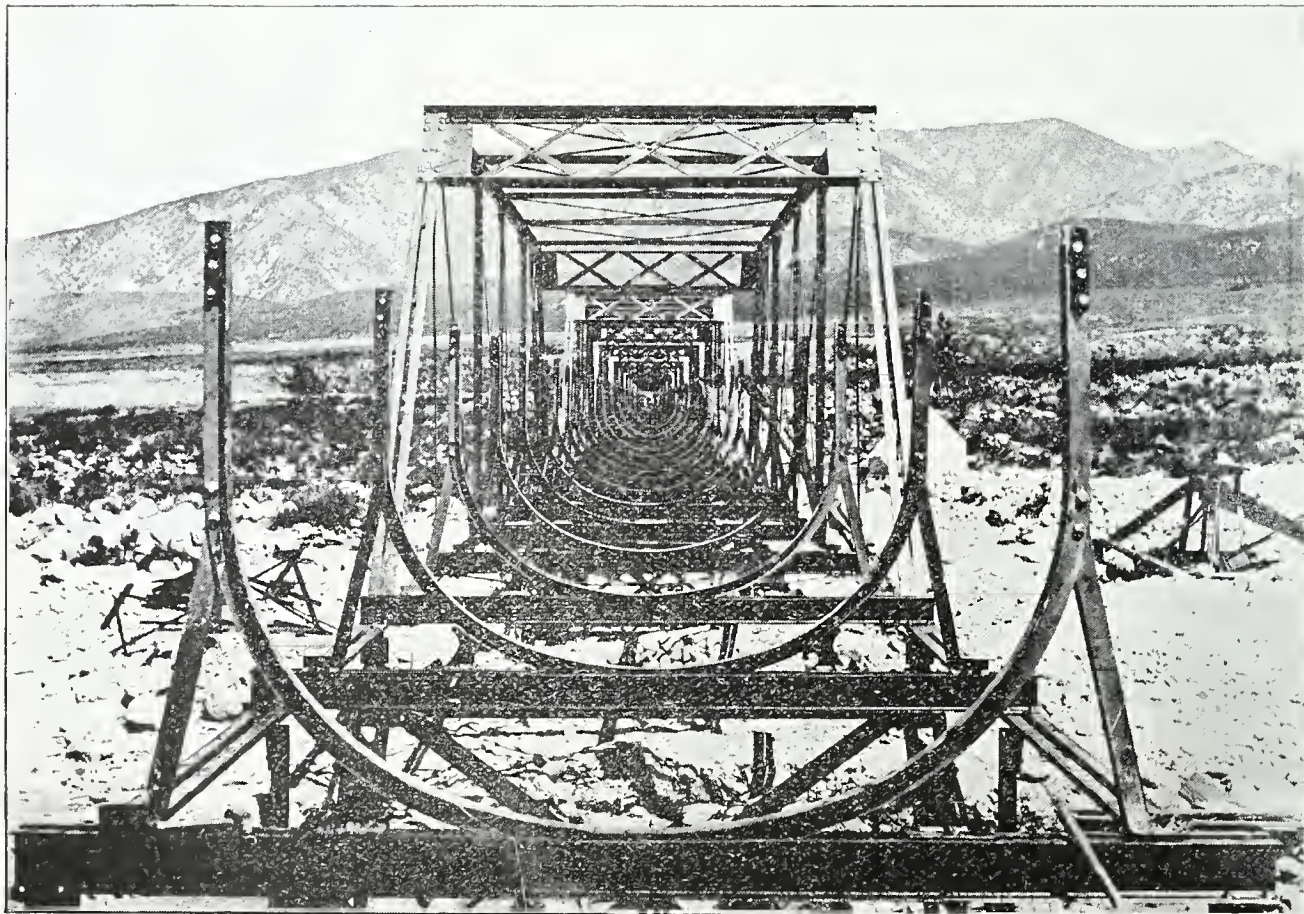
are infrequent, do not realize what a vast portion of the public domain in the United States lies in the arid and sub-arid regions beyond the great Mississippi valley. Take a map of the United States and draw a line beginning at a point on the northern boundary about one degree west of the eastern border of North Dakota and continue southward through South Dakota, Nebraska, Kansas, Indian Territory and Texas to the Rio Grande and some idea of the vastness of the great arid and sub-arid belt can be gained. In nine-tenths of the area of this region irrigation is necessary to successful agriculture and horticulture. The question of artificial water supply becomes, therefore, one of the greatest problems of the age.

In an article on "American and Indian Irrigation Works Compared," published in a recent issue of the "Irrigation Age,"—the leading exponent in the world of irrigation and its kindred industries—Mr. H. M. Wilson says:

"The development of the scientific practice of irrigation engineering in this country is a thing of today. It can scarcely be said that fourteen years ago there existed a single irrigation work of magnitude designed on sound engineering principles. The art of American irrigation engineering has only been developed within the past decade, while most of the more modern and creditable works are but approaching completion.

Like everything which Americans undertake, now that they have really begun the development of their irrigation resources, they are bringing to bear upon it their proverbial push and energy, and the advance made in the number and magnitude of works under construction is only keeping pace with the skill and intelligence displayed by engineers in overcoming difficulties and developing the science of American irrigation engineering. The changes wrought in the practice of this science in the past few years are astounding. There are under construction to-day numerous irrigation works, both for the utilization of the perennial flow of streams by direct diversion and for saving the storm flow of intermittent streams by means of storage. There are completed or under construction a dozen canals with capacities varying from one thousand to two thousand second feet, with

acres to a farm, homes and support for fifteen thousand people. Of storage reservoirs there are a half dozen completed or under construction, which will impound from one thousand to three hundred thou-



BUILDING A FLUME ON BEAR VALLEY IRRIGATION SYSTEM.

sand acre-feet each, or sufficient to irrigate and reclaim more than half that many acres of land.

The irrigation works of the United States are second in importance to those of no other country in the world, and while not of such magnitude as those of India, compare very favorably with them in mode

social industry of our time and country is irrigation.

"In humid America the extent of its usefulness is not much thought about. It is only lately that the irrigation problem has awakened interest, and I regard it as an evidence of the aroused interest in this subject that conventions are being held in va-

rious states, inviting a discussion of this subject. Such a thing was not possible a few years ago. It shows that the irrigation idea has at last penetrated the public mind, that it has fastened itself on the mind as a matter of importance, as a matter worthy of consideration on the part of those who largely direct public affairs, as well as those who place dependence on the art for their support.



SIPHON PIPE, BEAR VALLEY IRRIGATION SYSTEM.

"The farmers in the humid region would do wisely to consider the aggregate gain to capital that could be made by great attention to irrigation. Our climate is changeable, sometimes too much rain, sometimes too little rain, and rain at a time when it is of little use to the farm and orchard. It is not suggested that great canals and irrigation works should be established in this region, but it is insisted that drouth loss can be minimized by use of water that lies near at hand and now goes to waste. It lies on the surface in ponds and lakes, or runs in perennial streams, or in the earth near enough to the surface to be often availed of by some method of lift irrigation. Our long summer drouths occasion great losses. Farmers may largely avoid these by even that partial and inexpensive irrigation which very many localities make practicable. The meadows, the gardens and orchards may profitably be irrigated in the humid region. I mean the expense of providing irrigation for such special uses will generally be justified by the large increase of the amount of crops, as well as by the evading of drouth losses. Five acres, or ten, well cultivated and supplied with abundant water, will yield, in the course of ten years, as much profit as fifty or a hundred acres equally well cultivated but without any provision for the necessary moisture."

The cuts published in connection with this article are taken from photographs of the celebrated Bear Valley irrigation system in Southern California. This system was planned and prosecuted to completion on a magnificent scale. It redeemed thousands of acres of arid land and turned a desert into a veritable paradise. The Bear Valley Irrigation Company, however, failed in December last, which forms the subject of an interesting article on the investment feature of irrigation enterprises by the editor of "Irrigation Age." He attributes the failure of the Bear Valley Company to the under-development of its industrial opportunities and the over-development of its stock-jobbing possibilities. The company, which obtained something like \$3,000,000 from confiding capitalists in New England and Europe, is now attempting to reorganize on a \$4,000,000 basis, and it is confidently expected that it may succeed. Certain it is,

says the editor of "Irrigation Age," that this failure will not be the cause of permanent discouragement of capital in like enterprises. The Bear Valley system stands to day and will stand in the future, as it was popularly believed to have stood in the past, the true type of American irrigation enterprise at its best. It delivers more valuable water to more valuable land than any other system on the continent. Its works are the product of the finest engineering ability that money can command. Its lands are in the heart of that portion of arid America where the cultivation of the soil brings the largest returns, and where the assurance of high and rapid development in the making of communities is the most certain.

The Nicaragua Canal.

The greatest undertaking that now faces the business world is the construction of the Nicaragua Canal. No other enterprise, not even the vast colonization schemes by which Great Britain expects to open up to the civilized world the Dark Continent, says Manufacturers' Record, begins to measure in influence upon the destiny of the human race and upon the world's trade the opening of a highway between the Atlantic and the Pacific. Senator Morgan has justly styled this "the crowning glory of this wonderful nineteenth century." It is difficult to adequately portray, without being accused of the wildest enthusiasm, the marvelous change that must inevitably follow the construction of this canal. No other great commercial enterprise which has ever been put through in the history of the world has had a more far-reaching effect than the Nicaragua Canal will have when it shall have been completed. Its construction must revolutionize the carrying trade of the world; it will unite in closer development the Atlantic and Pacific coasts of our country and vastly stimulate interior development; it will give to our country more of the vast commerce of the East—a commerce that has enriched every nation that has ever controlled it; it will open wider markets for the products of our factories and farms; it will create throughout the entire country a growth far surpassing in magnitude the wonderful change wrought by the construction of the first railroads across the continent from the Atlantic to the Pacific.

Whatever may be the result of the work of the present Congress, however, much business may be re-



A CEMENT DITCH, BEAR VALLEY IRRIGATION SYSTEM.

stricted by unnecessary delay in the tariff fight, and whether wise or unwise be the final decision, the good work of this Congress will counterbalance its bad if it puts into effect the laws which will make it possible to begin the immediate and active construction of this canal.

Names of All Patent Attorneys.

There has recently been compiled by Virginia W. Middleton, the well known stenographer, a list of all attorneys practicing before the United States Patent Office. This little volume is of incalculable value to inventors, attorneys and manufacturers. The cloth binding costs \$1.50 and paper cover \$1. Send to THE INVENTIVE AGE, Washington, D. C. Edition limited.

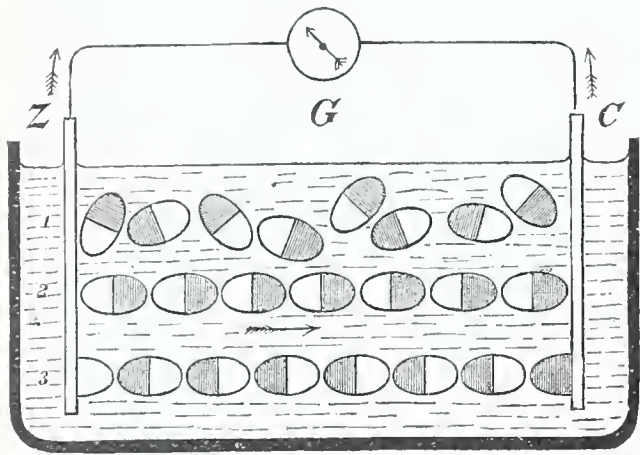
SCIENCE FOR YOUNG PEOPLE.

Conducted by E. P. LEWIS.

How does a galvanic battery produce an electric current, and what is the difference between a primary and a secondary or storage battery?

If you put a piece of zinc Z and a piece of copper C in a vessel of water containing a few drops of any acid, the needle of a galvanometer G placed in the circuit will be deflected, showing the existence of an electric current. This is the simplest form of a galvanic cell.

Volta, an Italian scientist, found at the beginning of this century that different metals are always at different electrical potentials or levels. By this is meant that if you join zinc and copper, for instance, by a wire, a current will flow for an instant from the zinc to the copper, just as water will flow from one vessel to another until it comes to the same level in both. To keep the water flowing we must pump it back from one vessel to the other. In the same



way to keep up the electric current we must find some means of taking electricity from the copper plate and carrying it back to the zinc, so that they may never come to the same potential. The chemical actions that go on in the water do this.

Water is composed of the two gases oxygen and hydrogen. Let us suppose that the egg-shaped objects in the diagram are molecules of water, the white part being oxygen and the shaded part hydrogen. Chemists believe that the first of these gases has in it a charge of negative and the latter a charge of positive electricity and that which unites them in the molecule of water is probably the attraction between the two kinds of electricity. The top row shows the molecules as they are in ordinary water, pointing in all directions. The middle row shows them pointing like magnets all in the same direction. The attraction of the positive zinc and the negative copper has done this. Next the acid begins to dissolve the zinc. The acid is a combination of some substance (sulphur, for instance, in sulphuric acid), with oxygen and hydrogen, and when we say that it dissolves the zinc we mean that the zinc has a stronger attraction for sulphur and oxygen than the hydrogen and replaces it. We have good reasons for believing that in an acid solution the molecules of water are continually breaking up and combining again, perhaps in different pairs, dancing around and changing partners, as it were. The free hydrogen atom grabs the first uncombined oxygen atom that it can find, and the other displaced hydrogen atom moves over toward the attracting copper plate. Finally the last hydrogen atom in the row attaches itself to the copper plate. Unless the plates are joined by a wire the process stops here, and no more zinc is dissolved, but if they are connected by a wire the hydrogen gives up its positive electricity to the copper plate, and it flows over to the zinc to replace the electricity which has gone to neutralize the negatively charged part of the acid. Thus there are two opposite processions of atoms in the liquid—oxygen carrying negative electricity to the zinc and hydrogen carrying positive electricity to the copper, and in this way the current is kept up. The bottom row in the figure shows this, an oxygen atom being attached to the zinc plate and a hydrogen atom to the copper.

* * *

If you watch the galvanometer needle you will notice after a while that it begins to move back. The current is running down. The reason is that the copper plate becomes partly covered with a layer of hydrogen atoms. These not only hinder other atoms from giving their electricity to the plate, but since hydrogen is more positive than zinc,

there is a tendency for a current to flow in the opposite direction. This is called polarization, and it prevents us from using the simple cell. There are various ways of preventing polarization. One of the best is used in the Daniells cell. The copper plate is placed in a porous clay cup filled with a solution of bluestone (copper sulphate), and this is placed in a larger vessel filled with acidulated water containing the zinc plate. The hydrogen in this battery never reaches the copper plate, for it replaces the copper in the solution, which is then deposited on the plate, so that there is no polarization.

* * *

If you prepare a simple cell like that in the figure, but use two copper plates instead of zinc and copper, you can make what is called a secondary or storage cell. Pass a current from two or three cells through the acidulated water. It will be decomposed, the oxygen going to one plate, the hydrogen to the other. Disconnect the wires from the battery and join their ends. The galvanometer needle will move in the opposite direction. You have now a hydrogen-oxygen cell, and the current will flow until the two gases recombine. If you use two lead plates, the oxygen will unite with, one, forming oxide of lead, and the current will last a longer time. The ordinary commercial storage cell is made by covering two lead plates with an oxide of lead. In charging them with a current the oxygen deposited on one plate combines with the oxide, forming what is called a higher oxide. The hydrogen on the other plate unites with the oxygen, reducing the oxide to metallic lead. The result is that we have two entirely different plates, which will act like an ordinary primary battery when the circuit is closed. The current then goes in the opposite direction, and carries oxygen back to the metal until the two plates come back to their first condition.

* * *

Now you must not think because of the name that a storage cell really stores up electricity. First there were two plates just alike. The electricity made these two plates unlike, so that they would act just as two different metals in a primary battery. The electricity causes a chemical change, and a chemical change in the opposite direction produces electricity, but no electricity is stored up in the plates. The only way to store up electricity is in a Leyden jar or some other form of condenser made by coating a thin plate of a non-conductor, such as glass, on both sides with tin foil or some other thin metal. Positive electricity on one side will attract and hold negative electricity on the other, until they are connected by a conductor and can neutralize each other.

* * *

Science has taught us how we may make use of many things that we once threw away as useless. Some time ago I wrote about some of the many wonderful things that are now made of coal tar, which was once considered valueless. Cotton has almost as many uses. Some years ago cloth alone was made from it. Then chemists found how they could convert the innocent fiber into a deadly explosive. Nearly all chemical compounds with nitrogen in them are what the chemists call unstable—that is, to say they easily explode. Gunpowder is such a compound, made by mixing charcoal and sulphur with saltpeter, which contains nitrogen. Guncotton is made by treating the cotton with nitric acid. It is about fifty times as powerful as the same weight of gunpowder. Next the chemists found that the same guncotton might be made into a harmless and useful substance. Celluloid, of which are made cuffs, collars, buttons, billiard balls, piano keys and innumerable other things, is simply guncotton dissolved in camphor by heat and pressure, after grinding it in water to a fine pulp. Collodion is another useful substance made by dissolving the guncotton in alcohol and ether. It is used for making sensitive photographic plates and as a varnish to protect wounds.

Cotton seed, too, have their uses. By pressure an oil is obtained from them which is used as a substitute for olive oil, lard and butter. By a certain chemical treatment artificial india rubber is also made from it. The rest of the seed, called oil cake, is a very good food for stock.

Fenders for Trailers as Well as Grip Cars.

The Illinois Supreme Court has decided that street railway companies must provide fenders around the wheels of trailers as well as grip and motor cars. The decision is based on the suit brought in favor of a nine year old boy who was killed by jumping off an Evanston avenue horse car when the car was in motion, one of the rear wheels passing over his body and causing death. The court affirmed a verdict of \$5,000. The same court also affirmed a verdict of \$10,000 in favor of a stenographer who was injured in falling off a car owing to her dress being caught in the platform of the car from which she was alighting. Execution was stayed on the defendant promising to at once satisfy the judgment.

Effects of Electricity on Our Social System.

Long ago there was a bronze or copper age, and later an iron age marked a more advanced stage of civilization. The cycle of time has brought back these two ages rolled into one—the iron-copper age, for these are the materials which are indispensable in all industrial applications of electricity, the presiding genius of our present civilization. Speculation as to the future is an easy and generally a hazardous and unprofitable thing, but a little indulgence may be excusable in considering some of the more probably effects of electricity on our material welfare. Besides the more obvious industrial changes wrought by it, others, indirect, but not less potent in their effects, may be anticipated. During the past century, owing to the introduction of steam and the use of ponderous and costly machinery, the factory system has grown up, which, together with many beneficial results in the way of enlarged and cheaper production, has had some attendant evils, such as the formation of powerful trade combinations and placing the workmen too much at the mercy of their employers. The great advantages resulting from the division of labor will probably prevent the abolition of the factory system, but a reaction sufficient to check some of its evils may result from the possibility of economically running small manufacturing plants by electric power, which may be furnished at cheap rates by competing central stations. Another result more confidently to be expected is the effect on our agricultural communities. Steam railroads are expensive alike to their builders and to their patrons, so that, in spite of their comparatively rapid extension, large regions of country are now and will be for many years to come almost as isolated as they were in the days of the stage coach. But electric railways are now beginning to radiate from all our larger cities, and slowly but surely the backwoods will recede before them, and may at last disappear. This result will be hastened if our farmers will learn to use electricity not only in the heavier farm work which enslaves themselves and their sons, but likewise as a help in the household drudgery which makes the lives of so many farmer's wives and daughters little better than those of beasts of burden. If the farmers were to show a progressive tendency toward the use of electricity for threshing, grinding, sawing, churning, running sewing machines, lighting and heating, central stations would soon dot the country, connected by a network of electric railways. Our country people would then be within reach of social and educational influences which many of them now lack, and would have more leisure to enjoy them. The increased attractiveness of country life might stop the tide of discontented humanity now surging into our cities, perhaps turning it the other way. Rapid and cheap transit will not only make it possible for the more prosperous classes to have country homes, but also for the present residents of our tenement houses to exchange the miserable surroundings which have disease and crime as their inevitable heritage for the purer atmosphere of the country. If these things should ever come to pass it will not be the least of the triumphs of science and invention.

E. P. LEWIS.

Deer Park on the Crest of the Alleghenies.

To those contemplating a trip to the mountains in search of health and pleasure, Deer Park on the crest of the Allegheny Mountains, 3,000 feet above the sea level, offers such varied attractions as a delightful atmosphere during both day and night, pure water, smooth, winding roads through the mountains and valleys, and the most picturesque scenery in the Allegheny range. The hotel is equipped with all adjuncts conducive to the entertainment, pleasure and comfort of its guests.

The surrounding grounds, as well as the hotel, are lighted with electricity. Six miles distant on the same mountain summit is Oakland, the twin resort of Deer Park, and equally as well equipped for the entertainment and accommodation of its patrons. Both hotels are upon the main line of the Baltimore and Ohio Railroad, have the advantages of its splendid Vestibled Limited Express trains between the East and West. Season excursion tickets, good for return passage until October 31st, will be placed on sale at greatly reduced rates at all principal ticket offices throughout the country. One way tickets reading from St. Louis, Louisville, Cincinnati, Columbus, Chicago, and any point on the B. & O. system to Washington, Baltimore, Philadelphia, or New York, or vice versa, are good to stop off at either Deer Park, Mountain Lake Park or Oakland, and the time limit will be extended by agents at either resort upon application, to cover the period of the holders visit.

The season at these popular resorts commences June 23rd.

For full information as to hotel rates, rooms, etc., address George D. DeShields, Manager, Deer Park, or Oakland, Garrett county, Maryland.

THOSE PATENT SHARKS.

The "Inventive Age" Commended for Its Exposition of the Frauds.

Although THE INVENTIVE AGE has but fairly begun its investigations and exposures of those individuals with numerous aliases and companies with countless branches organized for the purpose of defrauding inventors, already four of these disreputable concerns are in the toils of the government authorities charged with fraudulently using the mails of the United States. Others are being covered and further action is delayed for the purpose only of accumulating evidence that will convict. That the efforts of THE INVENTIVE AGE are appreciated by inventors generally is evidenced by the hundreds of congratulatory letters already received accompanied by indisputable documentary evidence of the disreputability of nine out of ten of so-called Patent Brokers, Patent Agencies, Patent Investment, Patent Development companies and the like, that swoop down upon the unsuspecting, and in many instances confiding, inventor immediately following the issuance, each week, of the Official Patent Office Gazette. The article in the July issue of THE INVENTIVE AGE has been extensively copied and favorably commented upon by the press of the country, and reputable patent attorneys, whose clients have been victimized, have complimented the stand taken by the only magazine in the world published in the interest of inventors. The more the matter is investigated the greater the outrage appears, and that Federal interference is necessary is evident from the fact that deprived of the right to use the United States mails for their fraudulent schemes the occupation of these human vampires would be gone. There are humorous as well as pathetic features about these transactions, wherein the inventor buys his experience to the tune of \$10 to \$50. The ease with which the Patent Broker successfully entraps the inventor in some instances is supremely ridiculous, equalled only by the disgust and chagrin of the victim of misplaced confidence.

Out of the hundreds of letters received by THE INVENTIVE AGE from inventors and others in relation to the confidence game played by a score or more of so-called Patent Brokers in the United States and other countries, a few have been selected and are published herewith.

Nor are the Patent Brokers the only enemies the inventor has to deal with. The fraudulent and unreliable patent attorney is abroad in the land, and many inventors, after paying large fees for professional services, find themselves possessed of a patent that is a patent only in name—one that will not stand the light of investigation, and one that when contest comes is found to be wholly worthless. Many irresponsible patent attorneys have been disbarred from practicing before the U. S. Patent Office for various unprofessional acts and many more ought to be disbarred and will be disbarred just as soon as sufficient evidence can be secured.

In its fight against frauds and outrages upon the American inventor THE INVENTIVE AGE begs the co-operation of inventors, manufacturers and reputable patent solicitors everywhere.

RENDERING INVENTORS GREAT SERVICE.

WASHINGTON, D. C., July 17, 1894.

DEAR SIR: I have observed your attack upon the Patent Brokers. You will be rendering inventors a great service if you succeed in exposing the schemes of some of those fellows who are constantly defrauding inventors. If I receive information that will aid you in your endeavors in this behalf I will be glad to communicate with you.

Yours very truly,
J. C. DOWELL.

SAVED BY THE "INVENTIVE AGE."

TOMPKINSVILLE, N. Y., July 17, 1894.

SIR: In your issue of July I notice your remarks on Patent Sharks. I have had communication with O. J. Bailey, American Patent Agency, Chicago; Paul James Gregory, Marilla, N. Y., Association of American Inventors and several others. I have been afraid of all of them, but was about signing contract with the Association American Inventors, of Philadelphia, as I have a patent and wish to do something with it, but thanks to The Inventive Age, I am not roped in.

Respectfully yours,
J. F. TRAVER.

A TIMELY ARTICLE.

BOSTON, July 4.

GENTLEMEN: Your valuable paper of June number was given to me in Buffalo a few days ago just in time to save you the annoyance you would have been called upon to explain what relation G. B. Smith, of Chaffee, N. Y., was to your valuable paper, as he represents he was connected with it. Your timely article, "A Warning to Inventors," hit things just as they seem to appear to others. This Paul Gregory has played his hand long

enough, and it is hoped the steps that have been taken in bringing him into the U. S. Courts will accomplish what is hoped from those who wish to see such frauds get their just dues. The detectives as well as the officers of Buffalo have him well covered.

N. J. BUSBY.

DIDN'T BITE.

LOCKWOOD, N. Y., July 17, 1894.

DEAR SIR: Thanks for your paper, and clipping giving a list of frauds. Holgate was first on hand. Wanted to do me great favors, but wanted \$25.00 to begin with.

Yours,
J. H. ANDRE.

IN FAVOR OF EXPOSING "SHARKS."

ST. PAUL, Minn., July 11, 1894.

GENTLEMEN: I notice with pleasure that you are exposing the Patent Sharks.

Respectfully,
A. M. CARLSEN.

COMMENDS THE "STRIKE FOR FREEDOM."

WASHINGTON, D. C., July 3.

DEAR SIR: Replying to your favor of May 7th, I am pleased to note the fact that you have made a strike for freedom, so that your paper will have a proper condition of independence.

Yours very truly,
WILLIAM MACOMBER.

SAMPLES OF "SHARK" LITERATURE.

CAMP POINT, ILL., July 12, 1894.

GENTLEMEN: I note in my July AGE you say you expect to continue your inquisition of patent shark thieves, and that you request samples of shark literature. I mail herewith, as my contribution, a stack of communications [letters and circulars from twenty different concerns] from various smart men, great companies and learned societies. I doubt if you will take the pains to mail all these papers back to me, and by the loss of them my great grandchildren will be deprived of all this evidence of how big a man their grandpa was. But their loss may be the gain of some deserving inventor, and I let the papers go in the cause of giving some hounds a bad name.

Yours truly,
C. S. BOOTH.

POUND, VA., July 13, 1894.

DEAR SIR: I notice in your issue for July an article entitled "Patent Sharks," in which you ridicule or expose the methods and dishonest purpose of those companies that call themselves patent agencies. I obtained a patent for Gage Brace June 19, 1894. I immediately received a great many letters, etc., from such agencies as the Adamson Co. and several others which you reviewed in your July issue, among them the American Patent Agency, of Cincinnati, O., O. J. Bailey, Manager, of which I enclose some letters, circulars, etc. Mr. Bailey claims to be publisher of the "World's Progress," a periodical devoted to the interests of manufacturers and patentees, etc. (1). Will you kindly tell me through your columns if said company is reliable. (2). Are there any agencies or promoters who will safely and reliably handle patents for patentees in the United States? I am a constant reader of your interesting paper, and doubtless an answer to the above question would be of much value and interest to many of your subscribers and readers.

Very truly yours,
J. F. ALLEN.

BALTIMORE, Md., July 10, 1894.

GENTLEMEN: I read yesterday your last issue and was very much pleased at the way you scored those patent sharks. I have letters from all of them and I will admit that the Adamson Company worked me for \$10 dollars last year, and have had the gall to write me several letters lately about my other patents. That man George B. Smith came near trapping me but he didn't quite do it.

Yours truly,
J. W. T. GILLIAM.

Expressions of Approval.

BEEN DUPED BY SWINDLING PATENT AGENCIES.

LOS ANGELES, CAL., June 15.—I was pleased to see your article concerning patent exchanges, in the June number, which is just to hand. I could send you a half bushel of letters and circulars which I have received from these institutions, but it will perhaps be of especial interest to you to receive some communications of the American Patent Exchange of Chaffee, New York, who claim to publish "The Inventive Age."

As I have been duped by one institution of this kind, not a thousand miles from your city, I am heartily glad to assist in any effort to expose similar frauds. Had I used the money which I sent to this institution for legitimate advertising in your excellent paper, it is very probable that my patent would, by this time, have been sold.

Yours truly,
BENJAMIN F. FIELD.

UNGROUND FEAR.

WASHINGTON, D. C.—A few months ago when my partner, James T. DuBois, retired from business life, and when I was compelled by pressing professional duties to dispose of my interest in THE INVENTIVE AGE, I was afraid that the journal which we had founded might fall into the hands of those who would not maintain its dignity and tone. The recent numbers of THE INVENTIVE AGE show that my forebodings were entirely groundless, and I desire to compliment and thank you also for the superb manner in which the journal has been maintained. Your success has far surpassed my fondest hopes. Each succeeding number, with its beautiful illustrations, and first-class articles seems to be an improvement on its predecessor, and if this improvement continues at the same ratio, it will be the finest scientific journal in the land, and I will be still more proud of the honor of having been one of its founders.

Yours truly,
RHESA G. DUBOIS.

MUCH PLEASED WITH IT.

NEW IBERIA, LA., May 16.—Enclosed find money order for \$1 to renew my subscription to the INVENTIVE AGE. I am much pleased with it.

Respectfully,
GEORGE C. STANTON.

WANTS AN EXTRA COPY.

FLOYD, TEXAS, May 15.—I like your paper very much, please send me an extra copy.

Yours,
S. J. WILLIAMS, S. & M. E.

Inventor's Difficulties.

The Cycle Trade Journal very truly says:

Many and varied are the difficulties which beset the path of the present day inventor. Only too often, at the very commencement of his inventive career, he is unfortunate enough to fall into the hands of a certain class of patent agents, whose object in life is to extract from the pockets of the oftentimes excitable and pliable clients as many fees as the depth of their pocket will allow.

It is with a view of warning inventors of existing pitfalls that THE INVENTIVE AGE has undertaken the exposition of "patent sharks" and irresponsible "patent brokers." And for this reason the AGE should have the hearty and substantial co-operation of American inventors and manufacturers.

Testing Smokeless Powder.

During the last month the government has been conducting a series of tests of rapid firing and machine guns at Indian Head, and among other inventors present was Dr. R. J. Gatling, inventor of the wonderful weapon of destruction which bears his name. The tests are being made with smokeless powder and speaking of the wonderful energy of this powder Dr. Gatling says: "People are not educated to appreciate the enormous revolution in future warfare caused by the invention of smokeless powder. Already it has made obsolete between 3,000,000 and 4,000,000 of muskets in Europe that were built to shoot black powder, not to speak of the millions of cartridges, all of which the countries possessing would be willing to sell for a song. Here is a vast sum of wasted capital, but it is the inevitable result of progress. Our army guns in this country will soon be in the obsolete category, for to keep pace with the rest of the world we will have to adopt smokeless powder too. A gun loaded with it will send a bullet just twice as far as the black powder does. Again the new invention changes military tactics entirely, for in the battles of the future troops will never display themselves en masse to the enemy. Open fighting, as has been customary through all the ages, is a thing of the past, for it would mean utter annihilation. If smokeless powder had been in use during the late civil strife the war between the states wouldn't have lasted ninety days.

A rapid firing gun doesn't begin to fire with the rapidity of a machine gun. The former is usually of one barrel and is loaded with shells. It is a great gun for torpedo boats, but fifteen times to the minute is pretty good work for one of them. A machine gun of the Gatling type has from six to twelve barrels and with three men to operate, practically never ceases firing, one volley succeeding another at a speed of 1,200 discharges per minute. These three men can do more killing than a whole brigade armed with old-fashioned muskets. It is the machine gun, along with the smokeless powder, that is going to make war an impossibility."

Electric Smelting and Casting.

A recent number of L'Electricite, the French electrical journal, describes and speaks in favorable terms of a process for the electrical smelting and casting of metals which has recently been patented and tried with success in Germany. It is especially to be commended to mine owners in those parts of the United States where water power is abundant and fuel is scarce. The apparatus consists of a long air-tight smelting chamber, lined with glazed fire-bricks, which furnish insulation. When used for casting the chamber is filled with metal, and a heavy current passed through it. In a short time—15 minutes in case of iron—the metal is melted and is run through a central orifice into molds. The air and other gases may be exhausted during the process, thus avoiding oxidation. Castings weighing over two hundred pounds and of unusually high and uniform quality have been made. On account of the lower conductivity of the ores, smaller quantities must be used in smelting, and there is some trouble in getting rid of the slag. Nevertheless, the process has been successful, giving very fine iron, containing less than 3 per cent of carbon. It is estimated that under favorable conditions, pig iron may be turned out at about \$8 per ton. Even when steam instead of water power was used, it was found that the saving of fuel by this process amounted to from 30 to 50 per cent. At Copenhagen works have been erected to try the method on a large scale.

How often does the impatient user of the telephone, annoyed at the seeming unnecessary delay of "central" to respond, give the bell of his telephone an extra vigorous ring, as if to emphasize his disgust by creating great noise at the "other end" of the line. But he doesn't create any disturbance whatever at "central." The call of "central" simply causes a little brass drop to fall, which is all the notice required by the operator. Few patrons seem to realize this and frequently devote much time to the ringing of the bell that appeals only to their own ears.

M. L. S. BUCKNER, of Shelbyville, Ky., has discovered the process of manufacturing a glazing for covering the bottoms of ships, which the inventor claims will prevent corrosion and fouling. It would be difficult to over-estimate the value of such an invention. It is desired by the merchant marine as well as by war vessels and Great Britain, realizing the benefits to accrue has, it is said, offered substantial reward in the way of encouragement to inventions in this line.

THE German Government has decided to paint their torpedo boats bluish-gray, this color being, they consider, the least visible under the electric light.

PATENT DECISIONS.

DAILY *vs.* JONES.

This was an interference in the Patent Office; and the Commissioner of Patents decided that Elias Jones was the prior inventor of the wire reel, which was the subject thereof. The Examiner of Interferences, and the Examiners in Chief held that Charles I. Daily was the prior inventor, but when the case came to the Commissioner on appeal from the Examiners in Chief he reversed their decision and awarded priority to Jones. This ruling was made on the ground of negligence by Daily, who conceived the invention before his opponent, but did not follow the conception up with reduction to practice. On the other hand Jones conceived later, but was diligent in his efforts to reduce the invention to practice; and on these grounds the decision was made.

REECE BUTTON HOLE MACHINE CO. *vs.* GLOBE BUTTON HOLE MACHINE COMPANY.

This case was a bill in equity brought by the Reece Co., and charging infringement of two patents. One was withdrawn, however, before the hearing and the case decided as to the other, No. 240,546 issued to John Reece. Only claims 5, 11, 12, 13, and 18 were in question and the U. S. Court of Appeals declared them to be valid and infringed. The prayer of the bill was, therefore, granted and an injunction and order of an account was issued. The patent was for a button hole working machine and the question of the case was one of fact as to the infringement or non-infringement. In arriving at the conclusion reached the court applied the principle of law which gives the inventor benefit of the doubt and that which rules that the fact that an invention met with wide spread public favor should have affirmative weight in deciding the question of patentability. These rules are of common use, and have been the means of winning many a suit at patent law.

VON MUMM *et al vs.* FRASH & CO.

This case was a suit in equity brought by G. H. Mumm & Co. against Frash & Co., a party of American wine merchants who sell an aerated domestic wine and dress it in a bottle very much the same as the wine of Mumm & Co. They styled the wine "Extra Dry Champagne," and used labels for the bottles which lacked only the name of Mumm & Co., to make them fac-similes of that company's label. Quite a volume of testimony was taken and this established the fact that the trade accepted the words "Extra Dry" as characteristic of the Mumm production only, and did not regard it as a term common to all champagne. These being the facts together with the manifest intention on the part of the defendants to counterfeit the wine of Mumm & Co., the court issued an order for a decree in favor of the complainants.

COFFEE *et al vs.* GUERRANT.

This was an interference case in the Patent Office; and it came to the Court of Appeals of the District of Columbia on appeal from the decision of the Commissioner of Patents, awarding priority of invention to Guerrant. The invention in controversy was a tobacco stemming machine and one of great commercial value. In October 1883, John C. Guerrant filed an application for patent on the invention, but died in March, 1884, and his application became abandoned for want of prosecution. His widow, Mary L. Guerrant, having been qualified as an administratrix of his estate reviewed the application which was again abandoned April 4, 1880; and on March 29, 1890, she filed the last application upon which a patent has been granted. R. W. Coffee did not file his application until November 7, 1889, but contended that the operation of John C. Guerrant and his widow were so characterized by negligence as to defeat her right to the patent as against Coffee. This view of the case was not adhered to by the Commissioner or by the Court of Appeals for both held that the circumstances attending the Guerrant family were such as to justify the delay. This exhausts the chances which Coffee had for the grant of a patent standing out against that of Guerrant's.

M'KAY & COPELAND LASTING MACHINE CO. *vs.* DIZER.

This case came before the U. S. Circuit Court of Appeals, First Circuit, on appeal from the Circuit Court for the District Court of Massachusetts, who dismissed the bill in equity and refused an injunction restraining the defendants from the infringement of letters patent No. 197,607, issued to Copeland, Woodward & Brock. The patent was for a machine for aiding the workmen in stretching and drawing the upper of a boot or shoe over the last;

and the Court of Appeals held that the patent was valid notwithstanding the adverse decision of the court below and the fact that the invention when once complete was simple and apparently obvious. By means of the device in question a long standing and serious difficulty was surmounted and the value of the invention was very great. This fact was the cause of the defendant's infringement, and it was urged in their behalf that no inventive skill attended the production of the invention. Such a defence did not prevail, however, and an injunction and account was ordered.

SHAPLEIGH *vs.* CHESTER ELECTRIC LIGHT & POWER CO. *et al.*

This was a suit brought by M. S. Shapleigh upon letters patent No. 433,187 granted to him for a safety cut-off. The U. S. Circuit Court for the District of Pennsylvania, before which the cause was tried, declared that the device used by the defendants was not within the scope of the claims of the patent and dismissed the bill with costs. The case involved a question of fact as to the scope of Shapleigh's claims and it was held that they were limited to electrical terminals each provided with lateral supports. The Chester Company had no such construction. Therefore, the above noted decision of the court.

GROTH *et al vs.* INTERNATIONAL POSTAL SUPPLY CO.

This case came before the U. S. Circuit Court of Appeals, Second Circuit, on appeal from an interlocutory decree of the Circuit Court for the Southern District of New York, which decreed in favor of the complaint in a bill in equity to restrain the infringement of the second and third claims of letters patent of the United States No. 341,380, and of the first and third claims of letters patent No. 388,366 dated August 21, 1888. Each patent was for an improvement in mail-stamping apparatus, and each was granted to George W. Hey and Emil Laass, assignors to the complainant. After fully considering the case the decree of the Circuit Court was reversed, and the Court of Appeals declared that there was no infringement of claims 1 and 3 of patent No. 341,380, and of patent No. 388,366. The claims of these patents were limited to certain peculiar features of construction, notwithstanding the pioneer nature of the invention and for this reason the device of the defendants was beyond their reach. It was argued by the complainants that the claims should be given a broad construction because of the novel character of the invention, but the court justly held that this, while perhaps a hardship, would not change the scope of the claims. The decision of the court below, was, therefore, reversed.

KILMER MANUFACTURING CO., *vs.* GRISWOLD, *et al.*

The complainant as the owner of two letters patent, granted to Irving A. Kilmer, for improvements in adjustable bale ties brings this bill against the defendants for infringement. The first of these patents, was No. 282,991; the second No. 372,375. As to the first, No. 282,991, it was held that in order to be sustained at all must be restricted to the precise arrangement shown. This restriction placed it out of the reach of the defendant's device and nothing was obtained for the complainant on the patent. With the second patent the complainants were more successful. Claim two of such patent was held to be valid and infringed by the defendant's bale tie, which was manufactured under the patent to J. W. Griswold, No. 466,563. Accordingly a decree was ordered upon the second claim of No. 372,375, for an injunction and an accounting, but without costs.

SHELLABERGER *vs.* SOMMER, SOMNER AND SOMMER.

This was an interference case in the Patent Office, and it came before the Commissioner of Patents on appeal by Sommer, *et al.*, from the decision of the Examiners in Chief, awarding priority to Shellabarger. The invention in controversy was a wire fence. It seems to have been first conceived by Sommer, *et al.*, and in May 1889, they put a machine in operation, making by it the kind of fence embraced by the issue in the interference. Soon after they built a second machine, making slight changes over the original one, and upon the second machine fence material was produced of the kind described in the issue, and of the product about eighteen rods was sold to one Haas in June 1890, and about eight rods to Schmutz in April or May 1890. Shellabarger claims to antedate Sommer, *et al.*, on conception and reduction to practice. On or about July 10, 1891, E. F. Shellabarger, under the direction of M. M. Shellabarger, the Shellabarger of this interference, began the construction of a machine for making the fencing which was not completed until the spring of 1892. In addition to this, Shellabarger claims to have made the fence by hand as far back as October 1887, but this contention is only supported by the testimony of Shellabarger. These being the re-

spective dates of the parties, the Commissioner awarded priority to Sommer, *et al.*, and reversed the decision of the Examiners in Chief, on the ground that Shellabarger did not sufficiently prove his operations in 1887, and was therefore forced to take the date of 1892, which was far behind that of Sommer, *et al.*

PHILADELPHIA NOVELTY MANUFACTURING CO., *vs.* WEEKS.

This was a suit by the Philadelphia Novelty Manufacturing Co., against Albertus A. Weeks for alleged infringement of letters patent No. 226,402, dated April 13, 1880, and 274,941, dated April 3, 1883, both issued to Isaac W. Heysinger, and relating to what are known as stapling machines, being small tools for inserting and clinching wire staples near the edge of superimposed sheets of paper. The case comes to the U. S. Circuit Court of Appeals, Second District, on appeal from the Circuit Court of the U. S. for the Southern District of N. Y., the court below having dismissed the bill. In regard to patent No. 226,402, the court held that in view of the state of the art, it was limited to the specific structure claimed and was not infringed by a machine which lacks a part of each device specified in the claims as essential. As to the remaining patent, it being for improvements in stapling machines, consisting in altering the size of the guide-clips so as to permit the staple driver to be inserted both cross wise and length wise, and so as to give sufficient room to drive a staple with a projecting eye, it was held to be void for lack of invention. Accordingly the decree of the court below was affirmed, with costs.

Accidental Inventions.

Some of the most successful and remarkable engineering enterprises have been claimed to owe their existence to circumstances which, when considered in themselves, seem far too trivial to have produced such important results. Though opinions be divided as to the first transmission of power by electricity, for example, it has been strenuously maintained in some quarters that accident, pure and simple, was the cause of the great discovery, and an interesting story has been told for many years of the attending circumstances. This is to the effect that at the International Exhibition at Vienna, in 1873, the Gramme Company exhibited two dynamo machines for plating purposes. One of these machines was in motion, and a workman who noticed that some cables were trailing on the ground thinking that they belonged to the second machine, placed them in its terminals. To the surprise of everybody this second machine immediately began to turn, and it was then discovered that the first dynamo was driving the second. It would be strange, indeed, if there were not other versions of this story, and, accordingly, we find several somewhat different accounts, from all of which, however, it would appear that the development of any measurable power in a machine taking its supply of electricity from a primary dynamo was something wholly unexpected and correspondingly startling.

Closely analogous is the narrative of the origin of one of the most successful foundry blowers now in use, according to which the inventor was attempting to construct a water motor which persistently refused to go round when the water was turned on. In the determination to learn what was wrong a belt connection was made with a line shaft so that the motion of the machine might be studied. By the same means a reverse motion was given to it, and the way in which it threw the water, and, after the water had been exhausted, drove a current of air, suggested an entire change of purpose, and the machine was finished and put on the market as a blower instead of as a water motor, and thousands have been built since. The story, often told, with various modifications of detail, serves as an additional illustration of the fact that inventors frequently stumble upon success in entirely unexpected directions.—*Cassier's Magazine.*

Emerson's Oklahoma Puzzle.

A new puzzle that promises to rival "Pigs in the Clover" has made its appearance. It is the invention of Chas. A. Emerson, of Oshkosh, Wis., and is called the Oklahoma Puzzle. It consists of sixteen pieces, similar to chess pawns, which occupy sixteen spaces arranged in two squares, connected by the seventeenth space which is vacant. The puzzle is to move eight dark pawns to the square occupied by the eight white ones and vice versa. As there is at no time but one vacant space on the board and as the moves must be forward all the time; the puzzle is quite difficult.

UNDER the direction of Charles B. Brush, engineer, borings have been begun for the purpose of determining proper locations for the piers of the New York and New Jersey bridge.

NEWS CONDENSED.

JULY 1.—Seven strike leaders were placed under arrest in Chicago, and nine were arrested at Hammond, Ind. The Federal government appointed special counsel, and will take active steps to enforce the carriage of mails on railroads affected by the strike in the west. The funeral of President Carnot at Paris was made an occasion of the greatest display of its kind ever seen in France. 150 anarchists have been arrested at Rome, and 50 at Paris.

JULY 2.—A sweeping injunction against strikers was issued by the U. S. Court in Chicago. The State militia went into active service in the State of Illinois on account of the strike. Federal troops were ordered out in Colorado, to quell mining disturbances. A war cloud hovers over Corea, between China and Japan.

JULY 3.—The new mill of the Vermont Marble Company, Proctor, Vt., was destroyed by fire; loss, \$100,000. The jury in the Prendergast case, having found the prisoner sane, the murderer will be hanged July 13. Messrs. Edwards & Schriver, Washington newspaper correspondents, were indicted by the Grand Jury for refusing to answer questions in relation to the connection of certain congressmen with the Sugar Trust, before the Senate Investigating Committee. Nearly all the railroads leading from Chicago are blocked by the strike, and the Federal troops have been ordered out.

JULY 4.—Richard Croker returned from abroad. Ex-Governor Edwin B. Winans, of Michigan, died at Hamburg, Mich. The Democrats of Kansas nominated David Overmeyer for Governor, and adopted resolutions in favor of free silver. Hudson, Mass., was visited by a \$350,000 fire. A special session of the U. S. Grand Jury was called at Chicago, with a view of indicting strike leaders. Russia protests against Japanese interference in Korean affairs.

JULY 5.—Several men were killed in a riot at Butte, Mont., on account of the displaying of an A. P. A. sign in a saloon. Michigan Populists nominated A. W. Nichols for governor. Sioux City strikers stoned the militia, and in Chicago more Federal troops were ordered out, and much railroad property was destroyed by the strikers. The British government is trying to prevent a conflict between China and Japan. M. Aguste Burdeau was elected President of the French Chamber of Deputies. The Black Plague still rages at Hong Kong. The death of Sir Austin Henry Layard the explorer and archaeologist is announced in London.

JULY 6.—Several hundred cars were burned by the mobs in Chicago, and the firemen prevented from extinguishing the flames. President Cleveland received a protest from Gov. Altgelt against Federal interference in the labor troubles.

JULY 7.—The mob was fired on in Chicago by the State Militia, and a large number of persons were wounded. An order was issued by Gen. Schofield, placing the Union Pacific and Northern Pacific Railroads under control of the United States troops. Kelly's 350 Commonwealers disbanded at Portsmouth, Ohio. Congressman Marcus C. Lyle, of Kentucky, died at Winchester, Ky. The Hawaiian Constitutional Convention ordered that the Constitution of the Republic should be proclaimed on July 4.

JULY 8.—Coxeyites to the number of 400 under Jeffrey left Druth on a scow, towed by a tug for Buffalo. In a pitched battle between the regulars and mob at Hammond, Ind., one man was killed and four persons injured. The total number of deaths from the plague at Hong Kong is 24,634. Cholera still continues in St. Petersburg, 141 new cases and 52 deaths being reported for the past week.

JULY 6.—Federal troops were ordered to the Cœur d'Alene mining regions. A majority of the Chicago trades unions resolved to strike Wednesday unless the railroad strike is settled before that date. President Cleveland issued a proclamation of warning to rioters. The Pullman Company refuse to arbitrate, maintaining that there is no question for arbitration. The Britannia beat the Vigilant the third time.

JULY 10.—The strike in the National Tube Works, at McKeesport, Pa., is ended, the men returning to work. Debs, Howard and other American Railway Union leaders were indicted and arrested for conspiracy in Chicago, and released on \$10,000 bail each. An order was issued by Mr. Sovereign to the Knights of Labor throughout the country to strike. U. S. Troops have been ordered to Sacramento, which has been under mob rule for several days. An improvement in the railway service in Chicago is noticed. The Britannia again defeated the Vigilant in a race for the Corinthian cup on the Clyde.

JULY 11.—The appeal to the Knights of Labor to strike does not meet with general response, less than 15,000 members of allied trades going on the strike in Chicago. The strikers at Sacramento wrecked a train, killing the engineer and three soldiers, and seriously injuring four others. Knute Nelson was renominated for Governor of Minnesota by the Republicans, and the Populists nominated S. M. Owen. Gen. J. B. Frye, U. S. A. retired, died at Newport R. I. Earthquakes in the vicinity of Constantinople are said to have caused the loss of 200 lives. The Britannia again defeated the Vigilant.

JULY 12.—Geo. H. Williams, Professor of Inorganic Geology, at Johns Hopkins University, Baltimore, Md., died at Utica, N. Y. The authorities take a hopeful view of the strike. The Britannia defeated the Vigilant for the sixth time.

JULY 13.—The proposition of Mr. Debs to declare the A. R. U. strike off providing the general managers would take back the strikers, was refused by the General Managers Association. D. C. Knowles, D. D., was nominated for Governor by the Prohibitionists of New Hampshire. Two men were mortally wounded by the regulars who fired into a mob at Sacramento. Patrick Eugene Prendergast, was hanged at Chicago for the murder of Mayor Harrison, Oct. 28, 1893. Erastus Wimen was released from the toms in New York on \$30,000 bail.

JULY 14.—The trial trip of the Crusier Minneapolis, proves her to be the fastest war vessel afloat. President Debs says he will continue the strike indefinitely.

JULY 15.—Indianapolis strikers wrecked a freight train of 30 cars. Trains are running on the Southern Pacific again.

JULY 16.—By the explosion of the caisson of ammunition at Chicago, four Federal Cavalrymen were killed, and eight wounded. Pullman strikers are said to be inclined to return to work. The Vigilant was again defeated by the Britannia.

JULY 17.—Debs and other A. R. U. leaders were arrested on the charge of violating an injunction of the Federal Court July 2. Refusing to give bail they were sent to jail. The bill to permit Utah to hold a Constitutional Convention, and be admitted into the Union as a State, was signed by the President. The election in New South Wales resulted in the defeat of the government, and the return of 58 free trade, 39 protection and 28 labor members. The Vigilant defeated the Britannia for the first time.

JULY 18.—Gen. Carey was nominated by the people's party of Mass. The Committee on Suffrage of the New York State Constitutional Convention, voted against woman suffrage. Hawaii was proclaimed a Republic on July 4. Since July 1st there have been 1,500 cases of cholera in St. Petersburg.

JULY 19.—Clifton R. Breckenridge, of Arkansas, was appointed Minister to Russia, vice Andrew D. White, resigned. North Dakota Republicans renominated Johnson, and nominated Roger Allin for governor. Indictments against 50 strike leaders were found by Federal Grand Juries at Chicago

and St. Paul. The Federal troops were ordered withdrawn from Chicago.

JULY 20.—Central Market block in Minneapolis burned; loss, \$500,000. The Britannia again defeats the Vigilant.

JULY 21.—Birmingham, Ala., was visited by a \$500,000 fire. The strike has been declared off indefinitely at Sacramento, Little Rock and Butte. In the tenth race the Vigilant defeated the Britannia.

JULY 22.—President Debs and other A. R. U. officials issued an address to the public asking that Pullman cars be boycotted. Members of the Industrial Army in camp at Washington, who are detected in begging are being arrested.

JULY 23.—The hearing in the A. R. U. cases at Chicago was begun. Gov. Tillman, of South Carolina has issued a proclamation to open the State liquor dispensaries August 1st. Commonwealers are being sent to jail at Washington for begging on the streets. It is announced that the Kedive of Egypt is to marry the daughter of the late Sultan of Turkey.

JULY 24.—Fire destroyed the Knox express company building, Washington; three firemen were killed by falling walls. A caucus of Democratic senators failed to result in agreement on the tariff bill. Senator Hill made another speech strongly condemning the senate tariff bill.

JULY 25.—Gen. Coxey deserts the commonwealers and says he has business at his home in Massillon. Debs was let out on bail and the case postponed till September. Senator Culom's friends won in the Springfield Republican Convention. Jerre Simpson was renominated for Congress.

JULY 26.—Exciting scenes in the U. S. Senate: the Democrats lose Mr. Irby, but gain Mr. Stewart on the tariff measure. Maj. Wm. H. Upham was nominated for governor by the Republicans of Wisconsin. The North Dakota Democrats decided to fuse with the Populists on state ticket, with exception of congressman, governor, attorney-general and judge of the supreme court. Hostile operations between Japan and China over the Korean question were begun; the king of Corea was taken prisoner by the Japanese.

JULY 27.—News of the sinking of two Chinese transports by the Japanese war vessels was received; about 1,200 Chinese troops were drowned. By the refusal of Senator Stewart to vote the tariff bill was saved from defeat on tie vote and went back to conference. The final splice of the Anglo-American Telegraph Company's new cable was made. The Democrats of North Dakota nominated F. M. Kinter for Governor and N. G. Larimore for Congress; Bud Reeve unanimously nominated for Congress first as a joke, will also run as a straight Democrat. The French chamber passed the anti-anarchist bill.

JULY 28.—A locomotive in Chicago was shattered by a bomb and two men seriously injured. The case against President Debs and others was appealed to the U. S. Circuit Court of Appeals. It is reported that the deaths from the Plague at Hong-Kong numbered 120,000. James Mulligan of "Mulligan Letters" fame died at Maynard, Mass. Forest fires rage in Wisconsin and many lives were lost near Phillips. Troops are still required to protect trainmen on the Cœur d'Alene division of the Northern Pacific railway.

JULY 29.—It is said England favors China in the present crisis. The report that the Wellman exploration party were lost in denied. The cause of the caisson explosion in Chicago was defective shells. The business portion of Belle Plain, Ia., burned; loss \$450,000.

JULY 30.—Fire in Minneapolis, Minn., destroyed 25,000,000 feet of lumber covering an area of 20 acres. Senator Voorhees, illness was pronounced more critical. A meeting of the conference committee on the tariff bill failed to agree and the breach seemed wider than ever.

JULY 31.—Another naval battle between the Chinese and Japanese fleets was fought yesterday, July 30. After a fierce fight the Chinese ironclad man-of-war Chen Yuen, the largest and most recently built ship in the Chinese navy, was sunk and two cruisers built by the Armstrongs at Elswick were captured by the Japanese. Nearly 1,000 commonwealers around Washington are reported to be in a starving condition and many are leaving the camp; refusing to work, the citizens decline to give alms to them and the police arrest them for begging; the rank and file now admit that the scheme of marching to Washington was foolish and unfruitful.

Famous Mosque Destroyed by Fire.

The great mosque of Damascus that was destroyed by fire a short time ago was one of the most noted structures in the world. The great mosque stood near the castle. It occupied a quadrangle 163 yards long by 108 wide. Along the north side was an open court surrounded by cloisters resting on pillars of granite, marble and limestone. The mosque itself extended along the whole southern side, and its interior dimensions were 431 by 125 feet. In the center was a dome resting on four massive pillars. Underneath was a cave in which the head of John the Baptist was said to be preserved in a golden casket. The mosque had three minarets, one of which was 250 feet high, and upon it, according to Moslem tradition, Jesus was to have descended on the day of judgment. Round the mosque were traces of a court 1,100 feet long by 800 wide, encompassed by colonnades similar to those of the Temple of Herod in Jerusalem and the Temple of the Sun at Palmyra. Authorities have thought it highly probably that this was the site of the Temple of Rimmon, mentioned in Second Kings, v, 18, and that it became in after time the seat of the worship of Jupiter. In the fourth century it was converted into a church and dedicated to John the Baptist, and in the beginning of the eighth century it was seized by the followers of Mahomet.

Another Bullet Proof Coat.—Rifle balls that would have penetrated 20 inches of pine were successfully resisted by the new bullet proof coat invented by W. F. Leonard, of Brooklyn. It is claimed that the invention of Mr. Leonard is superior to that of Herr Dowe, of Germany, in that it is much lighter. It is believed, however, that neither of these inventions would be practical in actual warfare, because of their cumbersomeness.

The huge logs, of which the Washington state building at the World's Fair at Chicago, was built, have been removed from those grounds. The logs will be taken to France, where a building will be erected in imitation of the one at Chicago.

Books and Magazines.

ELECTRICITY ONE HUNDRED YEARS AGO AND TO-DAY. With copious notes and extracts. By Edwin J. Houston, Ph. D. Princeton, New York: The W. J. Johnston Company, Ltd., 253 Broadway, 199 pages, illustrated. Price \$1.00.

In tracing the history of electrical science from practically its birth to the present day, the author of this work has, wherever possible, consulted original sources of information, and he was fortunate to have at his disposal for this purpose the excellent library of the Franklin Institute, which contains perhaps the most complete collection of scientific publications of the last century to be found in this country.

As a result of these researches, several revisions as to the date of discovery of some important principles in electrical science are made necessary. For example, it is found that Sir Humphrey Davy was anticipated in the discovery of the electric arc by many others, and, in fact, did not claim to have been the first to discover the brilliant effects of the arc. Proper credit is given to Gilbert for his inductive methods, and in an appendix several writers are quoted to show that Bacon has been honored above his merit in this respect.

While, as the author states, the compass of the book does not permit of any other than a general treatment of the subject, yet numerous references are given in foot notes, which also, in many cases, quote the words in which a discovery was first announced to the world, or give more specific information in regard to the subjects mentioned in the main portion of the book. This feature will be found of interest and value, for oftener a clearer idea may be obtained from the words of a discoverer of a phenomena or principle than is possible through other sources. The work is not a mere catalogue of subjects and dates, nor is it couched in technical language that only appeals to a few; on the contrary, one of the most admirable features is the agreeable style in which the work is written, its philosophical discussion as to the cause and effect of various discoveries and its personal references to great names in electrical science. Much information as to electrical phenomena may also be obtained from the book, as the author is not satisfied to merely give the history of a discovery but also adds a concise and clear explanation of it.

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The Electrical World, New York, has donned a new dress—type very similar to THE INVENTIVE AGE—and, of course, handsome.

* * *

The "Tradesman," of July 1st, published at Chattanooga, Tenn., contains an interesting article on "Cotton Seed and Its Productions," illustrating the various methods of reducing the cotton seed for practical uses from the plantation to the gin. The seed, which for eighty years was thought to be practically worthless, and was an incumbrance to the cotton planter, is now known to be of great and of constantly increasing value. The business of manufacturing its various products is adding annually more than \$40,000,000 to the wealth of the South, and only a small part of the yearly crop is now used by the mills.

* * *

The form of "Paper and Press," published by Wm. M. Patton, Philadelphia, has been changed, and it will hereafter appear on the news stands of the country each month as a current magazine of printorial literature and art. The field of "Paper and Press" has been broadened and the contents of its July issue indicate a determination on the part of the publisher to invade the realm of illustrated, art, literary and technical magazines beyond that limit suggested by its name.

* * *

The Electrical World entered upon a new volume with the July issue, and the character of the matter and the excellence of the illustrations is only equalled by the evident prosperity of this well-known technical magazine. The publishers, W. J. Johnston Company, New York, announce, as an inducement to introduce the magazine in new fields, that for \$1 the magazine will be sent to any address until December 1st next.

* * *

"The New Science Review," is the name given to a magazine published at Philadelphia by J. M. Stoddart. Its aims are set forth in the publisher's announcement: "While yielding to none in the scientific value of its material, it strives to present it in a popular style. It does not assume that the reader already has an esoteric acquaintance with the matter in hand and starts from that standpoint—it supplies him with a standpoint; it explains before it demonstrates. Thus it occupies a position midway between the ponderous scientific journals and the lighter magazines."



Advertisements inserted in this column for 20 cents a line (about 7 words) each insertion. Every new subscriber sending \$1.00 to THE INVENTIVE AGE will be entitled to the AGE one year and to five lines one time FREE. Additional lines or insertions at regular rates.

FOR SALE.—My U. S. Patent No. 521,642, June 19, 1894. Lantern or Lamp Extinguisher. A novelty in its line; manufactured at small cost. C. W. Cottrell, Washburn, Wash.

FOR SALE.—A new patent for sale, \$25,000, or \$12,500 and Royalty; Inexpensive to manufacture; half a million to the right man if placed on sale at once. Address, S. M. Flint, Worcester, New York.

FOR SALE.—Patent No. 522,296, Rotary Steam Engine; the most economical and powerful engine ever invented; perfect, simple and reliable. For full information. Address, J. A. Johnson, Holmes City, Minn.

FOR SALE.—Patent No. 511,839, Driving and Steering Action for Cycles; motor can be applied to a two or three wheel conveyance, also will serve as a brake on a trolley car, or any other car, and instead of destroying power the "momentum" made by stopping the car will save nearly all of it by using the brake. The power can be used for a circular saw and in a hundred other ways. The New York Tribune illustrates and describes this novel invention and expresses its belief in its practicability. It is an ingenious arrangement for storing power when a vehicle is on a down grade that will be available for use to assist in up grades. Mr. Ford desires to interest some capitalist and practical business man in the invention and to that end invites investigation. Address, Wm. H. Ford, Shelton, Conn.

FOR SALE.—Patent No. 520,460, issued May 29, 1894. Kitchen Cabinet; will sell entire right U. S., by States or divisions, cheap for cash or satisfactory terms. Best household article known; a novelty; can be made cheap. Address, Minnie S. Thomas, Waterville, Wash.

FOR SALE.—Outright or State rights, patent granted September 26, 1893. No. 505,610, Improved Fruit Drier; thoroughly tested, good testimonials. Address, A. Jones, Pratt and President Sts., Baltimore, Md. 8-10

FOR SALE.—Patent No. 522,342, Hospital Bed, dated July 3, 1894. An invention that has merit; one that is practical. Address, A. Heilander, Sisters Hospital, Los Angeles, Cal. Box 438.

FOR SALE.—Patent No. 522,490—Ice-Cutter. The most complete and useful machine of the kind ever invented. Correspondence wanted with ice dealers. I have a money-saver—a thoroughly practical power cutter. Address, J. G. P. Putnam, Claremont, N. H.

FOR SALE.—Patent No. 516,393, Attachment for securing Storm Sashes, Storm Shutters and the like to the outside of Window Frame. (Cost to manufacture) 40 cents per doz. J. D. Johnston, Newport, R. I.

FOR SALE.—Allen Braced Wire Fence. New patent using bridge principles. Strong and simple, state and county rights. Circulars on application. J. E. Allen, 53 Ross St. Williamsport, Pa. 8-9

FOR SALE.—I have invented a process for glazing the bottoms of ships thus making them impervious to the action of the elements that now corrode and foul vessels. Will sell half interest. Write for terms. M. L. S. Buckner, Shelbyville, Ky.

FOR SALE.—Or on royalty an A No. 1 Caliper and Divider Adjustment. Address Arthur Munch, 653 E. 5th St., St. Paul, Minn.

FOR SALE.—Patent No. 486,944; Milk Stool. Has been thoroughly tested with good satisfaction. Will sell entire right or state rights. For further particulars address, R. W. Shaw, box 575, Lapeer, Mich.

FOR SALE.—Door Lock, No. 506,792, Pat. Oct. 17, 1893. Will sell for a reasonable price, either a state, royalty or entire right. Chas. P. Nixholm, Hecla, Beaverhead Co., Mont.

FOR SALE.—My patent No. 518,637; Improved Straw Stacker, to be attached to any threshing machine. It is automatic; a great improvement over the old kind; has been thoroughly tested. Write for particulars. A. Van Houwling, Leighton, Iowa.

FOR SALE.—A good patent. An improved Fly Brush, patented Jan. 20, 1891, useful in every family especially in South and Western States. No. 444,963. Will sell cheap for cash, or entire patent or part. For price and particulars address Mrs. J. Russell, Tabor, Iowa.

FOR SALE.—Patent No. 521,351, Automatic Boiler Feeder; patented June 12, 1894. If not sold this year, '94, will manufacture and sell myself. Address Henry J. Weissner, 244 Chestnut St., Pottstown, Pa.

FOR SALE.—By the patentee, recent patents for Sight Speed, Recording Speed, Recording and Pressure Gages, Fire Sprinklers, Domestic Creamery, Electric Car Elevator and Elevator Machines. Geo. T. McLaughlin, 120 Fulton St., Boston, Mass.

BUSINESS SPECIALS.

Advertisements under this heading 20 cents a line each insertion—seven words to the line. Parties desiring to purchase valuable patents or wanting to manufacture patented articles will find this a valuable advertising medium.

WANTED.—Twenty plants established in the Eastern States, with \$15,000,000 capital, to manufacture and sell the California Metallic Carriage Hubs or Wheels. Send for description. Wells H. White, 506 S. Main St., Los Angeles, Cal.

WANTED.—Correspondence with inventors desiring seamless articles made. On receipt of full description will submit estimate and send sample of a new material. Address, J. B. Kittredge, Westfield, Mass.

WANTED.—To correspond with some one having a good patented article, small and practical; with a view to manufacturing and introducing same. Address, Lock Box 12, Galtner, Nebraska.

WANTED.—Correspondence with capitalists seeking an investment in something profitable and permanent, having from \$1,000 to \$10,000 to invest will do well to enquire. Address, H. No. 212 Locust Street, St. Louis, Mo.

WANTED.—To purchase a good patent, some small novelty of merit or money saving or labor saving device with price within reach of all, to sell on royalty. W. H. Harmon, 2129 Madison Ave., Kansas City, Mo.

WANTED.—To sell or place on royalty. Paper File: holds any number from 500 to 10,000. Any paper can be removed and replaced without interfering with any other. Best ever invented. Address A. Armstrong, Box 141, Noblesville, Ind.

WARNING.—Do not manufacture or use that French Hand Cultivator advertised in the Philadelphia Record May 24. It is an infringement on my patent, 444,366, advertised in Inventive Age, March 22, 1892, and in American Inventive Progress, Indianapolis, 1893. F. T. Neilsch, Houston, Texas.

Electric Flashes.

The long distance telephone line will shortly connect New York with St. Louis.

The capital of the Western Electric Company, Chicago, has been increased to \$3,500,000. Gas pipes down less than two weeks in a section of St. Louis were found to be practically ruined by electrolysis.

The bill granting a franchise for the Boynton Bicycle Railroad between Boston and Lowell finally became a law.

A regulating socket has been devised and is now in use, whereby an incandescent lamp can be turned down like a gas burner.

About 100 miles of street railway now operated by horses in the southern portion of Chicago, are now to be equipped with the trolley system.

The town of Union, Mo., is lighted by electricity conducted from the Westinghouse station ten miles distant. The loss in transmission is estimated at less than 5 per cent.

The amount of light absorbed by the different kinds of globes used around arc lamps has been found to be 38 per cent with clear glass, 52 per cent with ground glass, and 69 per cent with opal glass.

The dam on the Colorado River, about three miles above Austin, Texas, which is to furnish 100,000 H. P. for electrical transmission to that city, is completed. Bonds for \$1,500,000 have been issued to construct the dam and plant.

The 200,000,000 candle power searchlight lately erected at Sandy Hook for coast defence purposes was subjected to a number of tests by the Ordnance Board, U. S. A., and proved satisfactory as a means of flash signalling between Sandy Hook and New York City, a distance of over sixteen miles.

While in the United States about 60 per cent of all the street railroads are worked electrically, representing about 7,500 miles of roads with about 17,000 cars in use, there are, at the present time, in operation in Europe only about 260 miles of electric street railroad, with an equipment of 720 cars.

Mr. W. H. Patton, of Chicago, is the inventor of a new street car motor. He employs a gas engine to drive a generator, which in turn charges a set of accumulators for supplying current to the street car motor proper. The inventor claims that he can operate cars under his system at one-half the expense of maintaining an overhead trolley system.

Articles for incorporation have been filed with the New Jersey Secretary of State for an electrical railway corporation with a capital stock of \$10,000,000. The scheme of the new company is the establishment of a vast trolley system connecting New York and Philadelphia and absorbing all the existing trolley roads in Central New Jersey. The corporation, which will be known as the New York and Philadelphia Traction Company, will, it is said, control quite 1,000 miles of track. The system will carry both passengers and freight.

Who Has Back Numbers of Inventive Age?

The INVENTIVE AGE wants the following back numbers and will be pleased to pay all expense of postage.

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1890—Nos. 25, 27, 28, 29, 30, 31, 32, 33, 36, 37, 38, 40, 41, 43, 44, 45, 47, 48, and 50.

1891—Nos. 51, 52, 54, 55, 59, 64, 72, 73, 76.

1892—Nos. 67, 78, 81, 88, 94.

1893—January, May, June and July issues.

Advise us by postal in advance of what numbers you will send and we will forward stamps for mailing.

THE INVENTIVE AGE,
Washington, D. C.

AFTERMATH.

THE Tremont and Suffolk mills at Lowell, Mass., employing 2,000 men, will start up again on the 13th inst.

THE Wagner Palace Car Company, on account of slack work, discharged 238 men from their Buffalo works.

AT New Castle, Pa., the tin plate mill started up July 1st with 300 hands. There has been trouble in procuring billets.

A NEW company, with a capital of 60,000,000 francs, has been formed in Paris to carry on the work of the Panama Canal.

THE Posey Underwood syndicate closed the purchase for the Ibex mine in Millard county, Utah, for \$135,000, and will erect a smelter at Oasis, Utah.

WILFORD H. SMITH, of Greenville, Miss., and Shipley Brashers, Washington, D. C., have been disbarred from practice before the United States Patent Office.

THE Cramps, of Philadelphia, were so elated over the success of the cruiser Minneapolis that an order was issued giving the 5,000 employees a holiday with full pay.

THE bill providing for the admission of Utah as a state has been signed by the President and the Senate Committee has also reported favorably on Arizona and New Mexico.

AND now there is a glue trust, all of the glue interests of the United States having been consolidated under the name of the American Glue Company, with a capital of \$2,100,000.

THE Williams Palace Car Company, capitalized at \$3,000,000, will immediately begin constructing cars in St. Joseph, Mo., to compete with the Pullman and Wagner companies.

THE House Committee on Judiciary has seen fit, for reasons just a little obscure, to report against the bill granting a charter for an electric high speed railway between Washington and New York. The majority hold the measure to be unconstitutional.

AN order has been issued directing the examiners to withhold from issue the application of the prevailing party in interference cases for thirty days from the date of the final decision, in order that an appeal may be taken to the Circuit Court of Appeals for the District of Columbia if desired.

THERE is at present being constructed at Constantinovka, in South Russia, a large iron and steel works with a capital of \$2,000,000 by the Donetz Forges Co. The works will include a large Bessemer steel making plant, a rail rolling mill, foundry forge and an engineering shop. The plant will, it is expected, be but in operation this year.

NOTWITHSTANDING the uncertainty and delay of tariff legislation there has been, since the end of the recent railroad strike, a general resumption of business all over the country. Not on an extensive scale it is true, but a better feeling exists, more confidence is noticeable and if Congress will speedily adjourn—even though no tariff bill is passed—business will soon resume a normal condition. Trade is improving and a better feeling prevails all over the country.

THE figures relating to railway bankruptcies during the first half of 1894 are interesting. In the last six months receivers have been appointed for 23 companies, owning 2,988 miles of road, and representing bonded debt and capital stock aggregating \$260,101,000. This makes a total in the last 18 months of 97 railway companies, owning nearly 32,000 miles of road and representing more than \$2,000,000,000 in bonds and stock, which have gone into the hands of receivers. This number of roads, added to the number in receivers' hands at the end of 1893, makes a total of 152 railway companies now operated by the courts.

THE fate of the tariff bill is still in doubt. The hostile attitude of the President to the Senate amendments to the House bill and the failure of the conferees to agree thus far, complicates matters to such a degree that predictions are not at all reliable. The Senate Finance Committee, backed by a Democratic majority, indignantly refused to accept the President's advice and the bill was sent back to the Conference Committee. The Senate amendments placing one-eighth of a cent differential on sugar at the behest of the sugar trust and taking iron and coal out of the free list are the amendments of the Senate most strenuously opposed by the House and the President.

An Extraordinary Offer.

THE INVENTIVE AGE has made arrangements whereby it can furnish the complete set of World's Fair views—220 in all—at a nominal figure. These views are not cheap wood cuts but fine half-tone cuts covering every important feature of the greatest of the world's expositions. THE INVENTIVE AGE one year, and this set of views will be sent to any address, postage paid for \$1.35.

Still another great offer is that of the People's Atlas of the world—maps and statistics corrected up to 1884—124 pages—maps of every state and every nation—a complete Atlas, with over 300 illustrations, usual price \$3 to \$5. We will furnish THE INVENTIVE AGE one year and send the Atlas to any address, postage paid for \$1.35. Reliable agents wanted in every county in the United States. Send for terms to

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Low Rates to Denver, Col.

The Baltimore & Ohio R. R. Co. will sell round trip excursion tickets to Denver, Col., from all points on its lines east of the Ohio River, August 8th, 9th and 10th, valid for return passage on trains leaving Denver August 19th, 25th and September 13th.

The rate from Baltimore and Washington will be \$47.40 and correspondingly low rates from other points.

Passengers taking the B. & O. have a choice of routes, going via Pittsburgh, Akron and Chicago; via Grafton, Bellaire and Chicago, or via Parkersburg, Cincinnati and St. Louis; double daily service of express trains, with Pullman sleeping and dining cars on all routes.

Summer Vacation Tours.

The Baltimore and Ohio R. R. Co., now has on sale at all its offices east of the Ohio River a full line of tourist excursion tickets to all the lake, mountain and sea-shore resorts in the Eastern and Northern States and in Canada. These tickets are valid for return journey until October 31st. Before deciding upon your summer outing it would be well to consult the B. & O. Book of "Routes and Rates for Summer Tours." All B. & O. Ticket Agents at principal points have them, and they will be sent post paid upon receipt of ten cents, by Chas. O. Scull, General Passenger Agent, B. & O. R. R. Baltimore, Md.

"Tips to Inventors."

This is one of the most instructive and useful works for mechanics and inventors. Its author is Robert Grimshaw, M. E., and the book, cloth bound, retails for \$1. THE INVENTIVE AGE for one year and "Tips to Inventors" will be sent to any address for \$1.50

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE, which keeps inventors posted in the art in which they are mostly interested. — The full address of any patentee, and number of patent found below sent to any address on receipt of one 2-cent stamp. — We will send, postpaid, to any address, printed copies of any U. S. patents, with specifications and drawings, upon receipt of 20 cents for one copy; 35 cents for two copies; 50 cents for three copies. — (See premium offer elsewhere in this issue.) — Address THE INVENTIVE AGE, 8TH AND H STS., WASHINGTON, D. C.

LIST OF PATENTS

GRANTED FOR INVENTIONS,
JULY 3, 1894.

[See note at head of this list.]

Abdominal supporter. B F Golding.
Abdominal supporter. M A Woods.
Advertising device, acrostic. N Burgess.
Alfalfa track cleaner. W P Harris and W R D Allen.
Amalgamator. E J Powell.
Anemometer, apparatus for obtaining. L Sternberg.
Axle, vehicle. W H Bustin.
Baling press attachment. J J Hiser.
Ball and socket joint. M Walker.
Band cutter and feeder. C von Riesen.
Bearing for connecting rods or links, adjustable. W and F Brockhausen.
Bearings with loose rollers, guide for. J W Hyatt.
Bed, hospital. A Helander.
Bed, portable folding. S C Wherry.
Bicycle. S A White.
Bicycle gearing. A D Anthony.
Bicycle traveling case. E Andrews.
Billiard cue tip fastening. A Schneider.
Bimetallic plates, manufacture of. E Martin.
Blotter, ink. F S Rudge and R E Doolittle.
Boiler feed. H J Weisser.
Boiler feeder. H C Lange.
Boiler furnace, smokeless. E Healey, R Williams, and E Loagmeyer.
Boiler furnace, smokeless. J Myerscough.
Boiler heads, machine for making. I B Davis.
Boiler setting, regenerative. G S Strong.
Boilers, oil injector for steam. G J Nopper.
Bolt lock. H P Brown.
Bolts with threaded or gimlet points, machine for providing. W R Wilbur.
Bookbinder, temporary. T Mauns.
Bookbinding strips, machine for applying. J I Knight.
Books and carbon sheets, holder for manifold. J S McDonald.
Boots or shoes, means for attaching india-rubber, &c., to the soles of. M Meier.
Bottle stopper, valve. J H Gault and C F Schrader.
Bottles, device to prevent fraudulent filling of. N W Crandall and E A Russell.
Box strap. V Chmelz.
Bracket. J R Barry.
Braiding machine. J McCahey.
Bridle bit. W C Wittmann.
Brush. J A Samppell.
Burglar alarm, window spring for. J Steiner.
Button. A J Shipley and T R Hyde, Jr.
Cabinet, street vendor's. D P Pierson.
Calendar holder. L G Fosse.
Can body forming machine. F M Leavitt and J G Hodgson.
Can heading machine. E Norton and J G Hodgson.
Can opener. C A and O W Hilt.
Can testing machine. J G Hodgson.
Car coupling. F Jobert.
Car coupling. G A Theobald.
Car fender. A L Clarke.
Car fender. W V Cleary.
Car fender and brake. H Maass.
Car fender, safety. D Harding and W L Fitzhugh.
Car, hand. T Talbot.
Car, trolley. H J Lyceet.
Carburetor. G H Burrows.
Carburetor. M W Hies.
Carburetors, air supplying apparatus for. G H Burrows.
Card frame or mount. J P Odgers.
Carpet sweeper. E H Raymond.
Carriage tops, lock prop joint for. L G Mayer.
Carriage wheel. M V Woncher.
Cartridge. E D Brainard.
Cash register and indicator. C Price.
Casks, machinery for manufacturing. T G Stevens and J Baker.
Channeling machine. H C Sergeant.
Charring tool for ornamenting wood, &c. J F Krueger.
Chisel. J A Arthur.
Chisel, mortising. J A Arthur.
Chain, centrifugal. R E Evenden.
Chutes of coal or ore docks, counterbalance mechanism for. R W Ericson.
Circuit breaker, electric automatic. C W Larson.
Clock sash. A M Lane.
Cloth napping machine. H S and T H Greene.
Cloth napping machine. E Schweinefleisch.
Clutch coupling. J B Allfree.
Cock, self lubricating stop. E M Dart.
Coffin lid hinge and fastener. W C Laugenau.
Coin holder. F F Arncliffe.
Coin sorting and packaging device. F E Arncliffe.
Combustion of fuel, smokeless. M M Armstrong.
Cooker, steam. W E Beveridge.
Cooling or condensing apparatus. G A Barnard.
Coping. J D Davis.
Cotton press. W S Liddell.
Cranberry gatherer. J M and S B Moody.
Crate, shipping. J Z Taylor.
Cream separator, centrifugal 2. G M Anderson.
Current motor, alternating. J F Kelly.
Current motor, alternating. W Stanley, Jr.
Currents, producing continuous motion by alternating. J F Kelly.
Cutter sleeve, rotary. H M Loomer and C G Belmer.
Damper. R M Hermance.
Decorating material. P M Heerwagen.
Dental abrading or cutting tool. W S How.
Dental apparatus. W Wright.
Dental articulator. G K Bagby.

Dental bite plate. W S How.
Dental engine angle attachment. C H Davis.
Dental engines, adjustable bracket for. A W Browne.
Deoxidizing or oxidizing apparatus. A B Kittson and A B Browne.
Derailing block. M Mitchell.
Dish cleaner. G I McCarten and A R Dickason.
Doubling frame stop motion. E Richards and R Lucas.
Drainage bin and chute. T Crane.
Drum or radiator, heating. J L Reid.
Electric circuits, distributing board for. R Herman.
Electric converter 2. G D Burton and E E Augell.
Electric machine, alternating current dynamo. J Thomson.
Electric machine, dynamo. C E Scribner.
Electric machine or motor, dynamo. C S Bradley.
Electric machine regulator, dynamo. C E Scribner.
Electric switch. J Van Vleet.
Electric wires, self locking cleat for. E Nashold.
Electrode, secondary battery. W Morrison.
Electrotypes or stereotypes for printing, making curved. J H Ferguson.
Elevator guide sheave. N P Otis.
Elevator safety device. W P Kidder.
Engines, starting appliance for compound. D A Wightman.
Eraser, blackboard. J D Kions.
Expandible cutter. J H Calkins.
Fats, making edible. J H Filbert.
Fence, wire. L J Ives.
Fence, wire. J J Shalvey.
Fence, wire. F F Shalabarger.
Fertilizer, mineral. E Gulick.
File case. D Sexton.
Filter. S B Cummings and D W Field.
Filter, water. A F Cook.
Fire alarm, automatic. C A Mann.
Fire alarm signal system, auxiliary. J Sachs.
Fire apparatus, door opener for. D H Burke.
Fire kindler, automatic. H H Sanner.
Fireproof construction. W L Caldwell.
Fisherman's reel. F V de Ben.
Fishing apparatus, electrical. E Poppowitsch.
Fishing reel. J S Freeze.
Flanging or heating edges of tin plates, &c. Machine for. J G Hodgson.
Floor and floor block. T A Lee.
Floor construction, fireproof. T A Lee.
Flour bolt, rotary. L Hertzer.
Flower holder for florists' use. S M Flint.
Fruit gatherer. H M Rabun.
Fumigator, poultry. B Coddington.
Furnace. W Freakley.
Furnaces, automatic device for feeding megass. W P Abell.
Furnaces, forehearth for smelting. M W Hies.
Fuse, electric safety. J Sachs.
Gage. C B Bosworth.
Galvanic battery. F Fullner.
Garbage receptacle. J D Houseman, Jr.
Gas governor. W O Ludovici.
Gas governor, automatic. J J Myers.
Gas making apparatus 2. J W Kenewel.
Gases with liquids, apparatus for mixing. C and F Bartelt.
Gate and registering mechanism. S Brown.
Glove fastener. W B H Dowse.
Gold and silver from their solutions in potassium cyanides. Abstracting. W D Johnson.
Governor, centrifugal. L O'Hara.
Grain, &c., apparatus for cleaning. H Jones.
Grain conveyor, pneumatic. F E Duckham.
Grain conveyors, delivery apparatus for pneumatic. F E Duckham.
Grate. C Brandt.
Gully catch pit and trap. J Phillips.
Gun, breech loading break down. A H Fox.
Halter, rope. T Doble.
Hame attachment. J A Spain.
Harrow, lever adjusting. W E Smith.
Harrow, spring tooth. W E Smith.
Harvester, corn 2. R Pederson.
Hat box. J Weber.
Hates, veneering C Vero.
Head rest. A W Browne.
Head rest. W E Hunt.
Heater. H C Cowdrey.
Heating apparatus, hot water. S N Margitroyd.
Heel. C L Schrader.
Hinge, awning blind. A Howes.
Hoist winding mechanism. W H Lindsay.
Hornby mill. R G Jenckes.
Hook and eye. F W Wall.
Hoop flaring and bending machine. J Flenkharp and T Schraumm.
Horse blanket. A F Ransom, (reissue).
Hot air furnace. G T Finley.
Hot air register. R S T Cissel, (reissue).
Hot air register. W M Dyas.
Hot water heater. W Vanderman.
Hub band. J Maris.
Ice cutter. J G P Putnam.
Ice lowering apparatus. C I Foster, (reissue).
Impact tool. J F Clement.
Insect powder duster. T Nagole.
Insulating material, manufacturing. A F Timmerholm and C F Peterson.
Insulator. R Mace.
Jib spirit. G Hook.
Kitchen cabinet. W H Phenice.
Knitting machine, circular. H A Houseman.

Knockdown table. S J Lucashevski.
Ladder, step. B A Wright.
Lamp, electric arc. E and F W Heymann.
Lamp, electric arc. J F Kester.
Lamp, electric arc. A Schweitzer.
Lamp, electric arc. A W Smith.
Lamp, electric arc. F Ferguson.
Leather waxing machine. E Guay.
Letters or other designs on card board, forming. C D Vassiliades.
Liquid dispensing apparatus. W M Fowler.
Lock. J J Ridgway.
Locomotive ash pan. H R Walker.
Locomotive draw bar. P Leeds.
Log carrier. R E Terry.
Loom. W G Connell.
Lubricator. W H Hallock.
Manufacturing apparatus gage. L M Bannan.
Mangle motor. M Johnson.
Marking tool. L Schaefer.
Mattress and bed pan, combined. G C Dougherty.
Meat cutter. W Koenen.
Metallic powders. E Huber and J Sachs.
Moistening apparatus, centrifugal air. G Josephy.
Moth proof bag. J Weinheimer.
Motion, machine for converting. J P Buckley.
Mower. T S Brown.
Music or other books, apparatus for turning over leaves of. W Coates.
Necktie holder. E Staelin.
Negative retouching apparatus. C Hornberger.
Nut lock. H Henderson.
Oar. W W Fraker.
Oar, bow facing. I D Wright.
Ordnance firing mechanism. J B G A Canet.
Oil can. J H Quackenbush.
Ordnance recoil check. J B G A Canet.
Ores, process of and mechanism for smelting. C M Allen.
Organ. R Hope Jones.
Packing. W J Ellis.
Paper box covering machines, chuck for. I Dreyfuss.
Paper, making transparent transfer. M Pfaffeneller.
Paper pulp boards in imitation of natural wood, making. W N Carnell.
Parasol for baby carriages. W A Marqua.
Parcel holder. W A Crane.
Penholder. E P McCollum.
Picture hanger. L Church.
Pilot bar lifter. P G Cotter, L Holladay and R J Duncan.
Pin. S Dancyger.
Pipe fitting, combination tool for. J Kohler.
Pipe holder. J B Davis.
Pipes, drainage trap for steam. E E Gold.
Planter and tobacco filler, combined. T L Gray.
Planter, check row corn. G R McGinnis.
Plow, swivel. A Gale and E Tremblay.
Plunger operating mechanism. C Whitfield.
Pneumatic tubing. C W S Turner.
Portable elevator. W M S Garrison.
Printer's quoin. D C Breed.
Printing machine. M Wright.
Printing surface and making same. A Ten Winkel.
Printing surface, producing. A Ten Winkel.
Pulley, friction clutch. J McCahey.
Pulley, sheave. F Guenther.
Pulp screen. J J Flanders.
Pulverizer and harrow. A D Powers.
Pulverizing mill. F J Judd.
Pump, rotary. S N Eisler.
Puzzle. C A Emerson.
Radiator, gas. L Strimban.
Rails, renewing old steel. E W McKenna.
Railway conduit, electric. A T Fay.
Railway, conduit electric. J H Tyrrell.
Railway crossings, electric alarm signal for. J J Ross.
Railway frog. A L Stanford.
Railway rail joint and bond, electric. J Meyer.
Railway signaling apparatus. P Ribard.
Railway signaling, electric torpedo apparatus and system for. J W Lattig.
Railway signaling, torpedo machine or apparatus for. J W Lattig.
Railway supply circuit, electric. R M Hunter.
Railway switch. R E Terry.
Railway switch. J I Vernon.
Railway switch and trolley, electric. F S Jerrin.
Railway track sanding apparatus. C W Sherburne, (reissue).
Railways, wire support for overhead electric. A W Jones.
Refrigerator. A Schuyler.
Refrigerator car. F E Canda.
Register for baskets, &c. A B Culver.
Revolver cylinder. J Laum.
Rivets, studs, &c., manufacturing. W S Wilson.
Roller press. S Tuttle.
Rolling pin and dough cutter, combined. C S Goodenough.
Roofing. J C H Schultz.
Rotary steam engine. J A Johnson.
Rubber, &c., process of and composition for manufacturing substitutes for india. A A Blandy.
Sash weight. G S Sergeant.
Saw frame, buck. T C Knowles and W J Adams.
Saw handle. E J Fulghum.
Saw straightening device. M Covel.
Scaffold, adjustable. M King.
Scraping or digging apparatus. C Vivian.
Screw cutting die stock. J J Harrison.
Screw machine. C C Hill.
Screw threads, automatically opening die for cutting. J Hartness.
Scutching flax, hemp, &c., machine for. G

E Donisthorpe and T Burrows.
Seaming machine, can. E P Holden.
Seams of sheet metal cans, machine for rolling or crimping end. J G Hodgson.
Seams of sheet metal cans, machine for rolling or crimping end. E Norton, J G Hodgson, and F M Leavitt.
Sectional boiler. W Vanderman.
Seeder. F R Packham.
Sewing machine table. W M Cuthbert.
Shade fixture, window. H Parker.
Shade shutter, adjustable window. C B Corliss.
Shade, window. H Parker.
Shaft support, vehicle. W Irving.
Sharpening device, knife or scissors. T T Hosack.
Sharpening machine, razor. C A Worden.
Sheet metal handle. M Bersted.
Ship or boat, compoundable. H Martini.
Shoe, ankle supporting. J M Horn and M Mayer.
Skate. J Forbes.
Sliver, vegetable. P L Mars.
Soldering machine, can 2. J G Hodgson.
Soldering machine, side seam. J G Hodgson.
Spooling frame yarn guide. G E Mayhew.
Sprinkling apparatus. D M Pinckney.
Sprocket wheel for chains. W A Leggo, Jr.
Stamp, rubber. R S Hall.
Steam boiler. M H Plunkett.
Steam boiler, water tube. A W Shearer.
Steam generator. P Dubiau.
Steam separator. T J Cleaver.
Steam separator. M W Hies.
Steam trap. J McKellar.
Steam trap. J J Royle.
Sterilizing purposes, receptacle for. O B W Schier.
Stone polishing wheel. F B Yerger.
Sugar from sorghum, extracting. G Monseles.
Switch closer, automatic. W I Wands.
Switch lock. D Lavery.
Tags, machine for the manufacture of shipping. G F Danielson.
Teaching telegraphy, machine for. T M Crepat.
Telegraph repeater. A D P Weaver.
Telephone transmitter. W R Cole.
Telephony, multiple. M Hinton and M Leblanc.
Tent and support. P F Noonan.
Thimble. H White.
Thrasher and separator, combined pea. J F Rhodes.
Thrashing machines, automatic feeder for. R L Cooley.
Tune sheet holder and guide, combined. F Clemens, Jr.
Toe weight, divisible. J Clark.
Tooth, artificial. E Bowhus.
Toy, whistling. E J Lanley.
Track crossing. M W Hies.
Training athletes, apparatus for. M L Wendling.
Trolley arm, conduit for. A T Fay.
Trolley wheel. C E Bostwick.
Trolley wire suspension clip. W F D Crane.
Truck, electric railway car. F O Blackwell.
Truck, hand. J Frenette.
Truck safety attachment, car. L F Fisher.
Trunk. G S Eggeman.
Trunk, writing desk. E von Pfeil.
Tunnel, subaqueous. E H Lunken.
Type writing machine. C H Boynton.
Type writing machine. G W N Yost.
Type writing machine, pneumatic. W Raab.
Valve mechanism. J Kelly.
Valve mechanism 2. E Reynolds.
Valve mechanism, blowing engine. E Reynolds.
Valve, tank flushing. J J Berry.
Vehicle gear. F J Buft.
Ventilator. P Goerlitz.
Violin bow holder. J H White.
Vise, bench. T J Welsh.
Wagon seat. R Pederson.
Washstand, portable. M H Wickman.
Watchcase spring. J H Fleming.
Watch lid or back machine. H M Crowell.
Water closet seat. P J Cahill.
Water tube boiler. M H Plunkett.
Windmill power transmitter. W E Shields.
Window guard. C Hetherington and J Theemling.
Wine press. F Zwigard and R Schworer.
Wood, preserving. J R Bate.
Woodworking machine. W Lyon.
Woodworking machines, carrier chain for feeding boards to. B G Luther.
Woven fabric 2. W G Connell.
Wrapping machine, newspaper. L C Crowell.
Wrapping newspapers, method of and machine for. L C Crowell.

PATENTS GRANTED JULY 10, '94.

Air brake. F L Clark.
Alkali, apparatus for manufacturing caustic. J L Roberts.
Amalgamator and settler. G W Strong.
Animal trap. A J Knapp.
Asphaltum pipe, machine for the manufacture of. J and D J Shultis.
Awning frame, door. J Zefas.
Bag frame. F W Heilmann.
Batteries, sectional can for ore. M I Cortright.
Beam, girder, post, etc., metallic. A E Krause.
Bearing, roller. F S Church.
Bearing, roller. J D Mattison.
Bedstead fastening. W F Bernstein.
Believe. R C Aikin and H Knight.
Belt, electric. W E J Lawlor.
Bicycle. H W Libbey.
Bicycle. T Miller, Jr.
Binder, metallic. J P Kelsey.
Blind operator, window. R E Hall.
Blind slot holder and fastener. A Harley.
Boiler. D Smith and H P Goldrick.

Bolting machine. L C Bonnet.
Bottle corking machine. A Tagliabue.
Bottle elevating device. F McLaughlin.
Bouquet holder. A L Marston.
Box strap. J A Bowler.
Brake. F D Verran.
Brush making, method of and means for preparing brushes for. A S Miles.
Buckle and trace support, harness. W Brady.
Building construction. T O'Shea.
Button hole repair patch. E P Roche.
Calcine furnace. J Prud'homme.
Calcining, manufacture of material for. E Watson.
Cane weaving machine, diagonal. H B and E Morris.
Car anti-oscillating attachment, street. B F Chollar.
Car brake. G W Kramer.
Car chair, revolvable reclining. A B Macklin.
Car coupling. W K Knight.
Car coupling. J M Stark.
Car fender. L Q C Lamar.
Car pilot. R A Crawford.
Car wheels, making composite. N Washburn.
Carbonating apparatus, fluid. L W Puffer.
Carburetor. O Vanorman, (Reissue).
Cartridge packet. J P Lee.
Cartridge packet holder. J P Lee.
Cash carrier. J L Pollock.
Cash register. C J Carroll.
Caster. W H Tucker.
Catch plate or striker. J K Clark.
Chair. T H Costello.
Chart for hotels, rooms. A H Leach.
Chocolate dip or coating tray. D F Gerber.
Cigar case, pocket. F Cronenwett, Jr.
Cigar lighter, electric. J J Eberhard and C G Schinkatt.
Cigar lighter, electric. C F Reiff and H Munk.
Cigar mold. F C Miller.
Cigarette machine. F G Hagen.
Cigarette machine. A P and E P Scaramanga.
Circuit closing device. P J Walsh, Jr.
Clamp. A M Cole.
Clasp. E S Smith.
Clip. C Ball.
Clipping machine, hair. O Olson.
Clocks, electric synchronizer for. L von Orth.
Cloth napping and brushing roller. L Clarenbach, Jr.
Clothes dryer 2. F J Bailey.
Clutch, frictional and positive. W E Chalfant.
Coal dump. J J Lane.
Coin carrying envelope. P L Fison and H Hingsworth.
Coin holding and delivering device. C C Earnist.
Coin package. W F Beasley.
Coin package delivery device. C H Wood.
Collar, horse. N Cunningham.
Conveying apparatus, traveling chain. A L Radford.
Cooker, jelly. L G Hughes.
Cooking device for fruit canning. F M Anderson.
Corkscrew. C Pnddefoot.
Corn sheller. G W Packer.
Cradle, child's swinging. W Dewey.
Cranberry picker. J M and S B Moody.
Crane, electric. E Hopkinson.
Crane, overhead traveling. J R Morgan.
Cultivator, garden. E Wood.
Current interrupter for high potential circuits. E Thomson.
Current motors, means for regulating alternating. E M Bentley.
Current separator. L F Johnson.
Currycomb. C H Blett.
Davit, Automatic boat. F Ench, H Fugel, J L Cooke, and G F W Schultze.
Rental chair. D Stuck.
Desk. T McCarthy.
Detergent. A Froidevaux.
Die and making same. A J Bradley.
Disinfecting device. P de Murguiondo.
Disinfecting device. S and E Tausig.
Door opener, electric. H F Keil.
Door opener or closer, folding. I Engel.
Door plate. D M Scott.
Drying machine. F E Burlingame.
Dust arrester. C F Verrell.
Dust collector. W P Thompson and P Var Gelder.
Dust or soot collecting machine. P Van Gelder and W P Thompson.
Dye, blue. W Herzberg and O Weber.
Egg beater, etc. A J Saltzman.
Electric distribution box. O D and M A Kleinstenber.
Electric heater. H W Leonard.
Electric machine, dynamo. L Bell.
Electric meter. G A Schoeffer.
Electric motor controller. J B Blood.
Electric switch. J Hutchinson.
Electrolysis of salts, apparatus for. I L Roberts.
Electrolytic apparatus. I L Roberts.
Electrolytic decomposition of salts. I L Roberts.
Electrolytic decomposition tank. I L Roberts.
Electrolytic diaphragm. I L Roberts.
Electrolytical apparatus. O Knofier.
Engines, variable exhaust for. G L Thiel.
Entomological specimens, device for mounting. S F Deaton.
Exercising apparatus. E Grauert.
Fagots or piles, apparatus for forming. J F Budke.
Feed mechanism, automatic. J Roger.
Fence machine, wire. J P Hatt.
Fence post, metallic. M H Baer.
Fencing wire. J B Cleaveland.
Ferrule machine. W Cannell.

File or bill book. W D Slaton.
Filter. C W W Ball and J L Gordon.
Fire escape. S R Briggs.
Fire escape. A G White.
Fire extinguisher, automatic. R L Cum-
muck.
Fire kindler composition. J D Le Bel.
Folding gate. W R Pitt.
Food product and apparatus. J W H
Campbell.
Frog, wrecking. W C Courdette.
Fruit drier. J B Clark.
Fruit jar. F A Dixon.
Fruit pitting machine. F C Staniford.
Frying batter, tool for. B F Metcalf.
Galvanic battery. L F Johnson.
Game apparatus. W E Castelow.
Gas, apparatus for manufacturing. E R
Ellsworth.
Gas cut off device 2. A Kleinfeldt.
Gas engine. F Hirsch.
Gas engine, explosive. J Walrath.
Gas mains, siphon test box for. A Bonvier.
Gas retort charging apparatus. J C Cham-
bler.
Gases, process of an apparatus for analyz-
ing. E A Velling and A Steinbart.
Glass bottles, &c., apparatus for molding
and blowing. J J Power.
Glue, purifying. P C Hewitt.
Gold, etc., from their solutions, precipitating.
C Moldenhauer.
Governor, electric. M P Schenck.
Grinding mill. T L and T J Turlevant.
Gun fore end fastening. F A Hultbeck.
Gun, magazine. A Lee.
Gun, magazine cane. E E Dyball.
Gutter, roof. P Hoenk.
Hammer, power. J M Anderson.
Hammock support. I E Palmer.
Harvester clutch device. H C Stone.
Harvester, potato. M L Aten.
Hatchet, shingling. C J Goodell.
Hay rake and loader. P M Thompson.
Hay rake and loader, combined side de-
livery. J W Harmon.
Heater. J McLoughlin.
Hinge for school desk seats. M L Noble
and E Buxton.
Hinge, spring. F Keil.
Hinge, spring. L Monat, Jr.
Hoe, garden. J H Andre.
Horse blanket fastening. J De Loney.
Horseshoe, bar 2. G W Wimple.
Horseshoe, elastic tread. H H Gibbs.
Hot water heater. A O Grassl.
House construction. S Sanderson.
Ice cream freezer. F M Snook.
Insulated armature coil. J H Slugg.
Insulating composition. J L Truslow, Jr.
Joist hanger. H A Goetz.
Journal lubricator. P Knauer.
Kettle and furnace, combined rendering. T
Cascaden, Jr.
Kneader, dough or batter. I Lobree.
Lamp, electric arc. E F Gwynn.
Lamp, electric arc. P Kirkegaard.
Lamp, electric arc. M S Okun.
Lamp hanger, electric. H C Henley.
Lamp heater. C Hemje.
Lamp holder, electric. M P Meyer.
Lamp lighter, electric. J C Chambers.
Lamp shade. A Feigl.
Lamps, wick adjuster for central draft. J C
Miller.
Lathe. W Lodge.
Liquid cooler. W O Savage.
Locomotive, electric. E Hopkinson.
Locomotive engine. E E Hanson.
Locomotives, contact bar for electric 2. J J
Green.
Loom, circular. O Schuler.
Loom, pile fabric. J Corzilius.
Loom shuttle threading device. E A Bour-
que.
Lubricating cutting edges of tools, means
for. P Chouteau.
Malt grinding mill. J Brauer.
Mandrel, expanding. S W Twining and E
R Collins.
Measuring instrument, electrical 2. E Wes-
ton.
Metals, apparatus for reducing, allowing,
remelting, and mixing. H F D Schwahn.
Miter box. J J Green.
Motor safety device. A W K Peirce.
Musical instruments, stop for pedals of. L C
Wegefarth.
Muzzle, animal. W H Sanborn.
Nut cracker. S Moore.
Nut lock. J C Brown.
Nut lock. A Fongere.
Nut lock. J W and A W French.
Nut lock. J H Hebblethwaite.
Nut lock 2. C Lehman.
Nut lock. C Siegenthaler.
Oil can. C Siemens.
Oiler for journal bearings, mechanical. G
H Cole.
Ore feeder, automatic. A Carsters and D
J McCormack.
Organ action, pipe. W and E J King.
Oven. A R Welch.
Packing. J W Peelle.
Paddle wheel, steamship. A Cooper.
Pattern, adjustable garment. C Osse.
Pawl for machinery, grip. A S Washburn.
Pen, fountain. D C Demarest.
Pen, fountain. H T Smith.
Photographic camera, magazine. G P
Sponner.
Piles in running water, apparatus for driv-
ing. W Baptish. (Reissue.)
Pipe wrench. J Lytle.
Pocket book and cigar case, combined. E
Waldenberger.
Pocket book, coin. K Tompkins.
Pool balls, constructing. V B Hubbell.
Pool balls, manufacturing. V B Hubbell.
Power shears. G Sears and W H Under-
wood.
Preserving haus, etc., apparatus for. A H
Hatch.
Pressure regulator, fluid. G H Walker.
Printing letters or other indications for in-
dexes of books, etc., apparatus for use in.
E A Goddin.
Printing plates, preparing surface. J Mul-
laly.

Pulley, expansible. B B Farnham.
Pulp couching and drying machine. H
Fairbanks and H Parker.
Pulverizing apparatus. J M Schultz.
Pump. C A Sellen.
Pump, foot. C L Burdick.
Pump, saliva. A R Lawshe.
Pumping engine. A F Hall and B O Gage.
Railway, cable. C W Hunt.
Railway collisions, device for preventing.
C Holtmann and N Schmidt.
Railway crossing danger signal. M W Par-
rish.
Railway crossing gate. F W Mills.
Railway motor gear casing. N C Bassett.
Railway oil box jack. F A Moore.
Railway rails, self-acting cleaver for grooves
or hollows of. D C Le Bras.
Railway rails, substructure for bracing and
supporting. J M Price.
Railway signaling apparatus. W G Scott.
Railway signaling purposes, detonator for.
H F Clark.
Railway supply system, electric. J J
Green.
Railway switch. D M Church.
Railway switch 2. S F Clouser.
Railway switch. S F Clouser and E C Sew-
ard.
Railway switch 2. W C Dillman.
Railway switch. E C Seward.
Railway switch, street. W E Murray, D W
and G W Hatfield.
Railway tie plate. W H Wilson.
Railway trains, steam heating system for.
G H Titcomb.
Railway trolley, conduit. J L Creveling.
Railways, closed conduit for electric. C I
Greer.
Range, gas cooking and water heating. B
S Koll.
Reduction apparatus. T Girvan.
Refrigerating liquid. M Warner.
Rock drills, rotating device for. H C Ser-
geant.
Rolling brake shoe key blanks into shape,
machine for. G H Judy.
Rolling metal. T Morrison.
Rolling mill housing. S T Williams.
Rope clamp. J Allenson.
Rotary drier. H Rich.
Sad iron handle. H A Sheffield.
Sandpapering machine. H N Range.
Sash balance. E F Smith.
Sash lock, lift and balance. O K Gardner.
Saw guard. F X Gote and L Corbelle.
Saw, hand. W H Bedell.
Sawhorse. C D Snell.
Saw set. F X Zahring and J B Spaedy.
Scow, dumping. F Fallon.
Scraper, kettle. H F W Jenke.
Sewing machine. E and R Cornely.
Sewing machine for stitching and barring
buttonholes. F R Austin.
Shade holder. J Hutchinson.
Shaft support and antirattler, combined. W
Cavers.
Shears joint. A J Krank.
Shipping can. T Lee.
Shoe support. W L Barrall.
Shutter, fireproof. I Smith.
Signaling apparatus, electric. J P Coleman.
(Reissue.)
Slicer and grater, combined vegetable. E S
Harst.
Soldering machine. C M Brown.
Sole channeling machine. J F Noonan.
Sole leveling machine. W L Barrell.
Splint and splint fabric. E A Tracy.
Stamp motor, time. P G Giroud.
Steam boiler. D Ahern.
Steam trap. A F Nagle.
Steel and the manufacture of edge tools
therefrom, converting cast iron blanks
into. J Hooper.
Store service apparatus. C Smyth.
Stovepipe. A Kuiser.
Strainer for conductor pipes. E G Minne-
meyer.
Strap attachment. J Reed. (Reissue.)
Straw stacker. F F Landis.
Straw stacker discharge pipe. F F Landis.
Straw stacker, pneumatic. F F Landis.
Stringed instrument. H Ackermann.
Sulky. J P Faber.
Sulky. S Toomey.
Table. W C Jones.
Tank combined with thermometer and gage.
J E Williams.
Tapping machine. M Crawford, Jr.
Teleautograph 2. E Gray.
Telephone circuit, operator's. T C Wales,
Jr.
Telephony. F R Colvin.
Theater chairs, coin controlled attachment
for. J W Patterson.
Thermometer attachment for hot water bags,
etc. H Weinlagen and F King.
Thrashing machine air blast attachment.
W L Johnson and W L Day.
Tile, roofing. S K Cohen.
Tile, roofing. J E Donaldson and J Athern.
Till lock and alarm. C H Morford.
Time detector, watchman's. J Matusch.
Time recorder, workman's. J Dey.
Time recorder, workman's. D Miller.
Tire, pneumatic. W P Jans.
Tire, pneumatic. C K Welch.
Tire, pneumatic bicycle. J Mariani.
Tobacco pipe. E Barron.
Toy vehicle. M Schaure.
Toy, wheeled. P J Hindmarsh.
Track, cleaner and switch thrower. I W
Hewitt.
Trolley ear. C A Lieb.
Trolley pole. A S McBean.
Trolley wheel. C A Lieb.
Trolley wires, combined hanger and auto-
matic switch for. R Scheffner.
Truss. R Nagler.
Truss. F A Wheeler.
Turning machine, roll. G Vine.
Tuxedo, forced draft. B F White.
Type setting apparatus 3. L K Johnson
and A A Low.
Type writing machine. L S Crandall.
Vacuum creating apparatus. W F M Mc-
Carty.
Valve for water pipe or mains, stop. I N
and J H Glauber. (Reissue.)
Valve, tank supply. J J Berry.
Vehicle wheel. C K Welch.

Vessel, marine. L N Tonn.
Vessels, construction of. E P Stratton.
Vessels, line holder for. E C Akers.
Veterinary tooth cutter. J J Robinson.
Wagon, dumping. S P Snyder.
Wall coating and making same, material for.
E Watson.
Wall decoration and making same, material
for. E Watson.
Wall decoration, making material for. E
Watson.
Washing machine. T Bunker.
Washing machine. C A Palmquist.
Watchmaker's combined tweezers and screw
driver. E White.
Watch movement plates, machine for re-
cessing. D H Church.
Water closet bowls, coupling for. G F
Brown.
Water meter, rotary. H J Rohlf.
Water purifying apparatus. H Desrumaux.
Watt meter. E Weston.
Weather strip. J Soydam.
Well cleaning device. G W Lee.
Well heater, oil. J S Lueck.
Welt trimmer. F A Dunham.
Wheel. G Lamb.
Whiffletree. A W Mitchell.
Whistle and valve for operating same, elec-
trically controlled. C E Ongley.
Window screen. B J Wolfe.
Window screen, rolling. E G Hastings.
Wood working machine. J S Graham and
J Kane.
Wrappers or labels around boxes, cakes, etc.
machinery for securing. A Stearns.

PATENTS GRANTED JUNE 17 '94.

Acid, manufacturing hypochlorous. G A
Cannot.
Addresser. J R Van Wormer.
Adjustable chair. J R Miller.
Advertising device, token. W Cummings.
Advertising machine, coin controlled. H A
Maulny.
Aerating water used in baths, process of
and apparatus for. W Lippert.
Air compressor, compound hydraulic. W A
Babecek.
Alarm signal, automatic. H S Bodley and
A P St. Martin.
Armature bar and making same. G Weber
and C W Markey.
Armatures, means for ventilating. T C
Goykendall.
Bag holder. E Attaway.
Baking powder can and measure. H R
Brown.
Banjo. R Kuenstler.
Battery plates, making. W L Silvey.
Beer faucets and returning same to kegs un-
der gas pressure, apparatus for collecting
drippings from. H Genovar.
Belt, cartridge and game. J R Randal.
Belt, metal driving. H Sewrey.
Bicycle. P Weber.
Bicycle saddle. A L Garford.
Bicycle, etc, variable speed gearing for. A
B Stebbins.
Blower, steam jet. D J Crozier.
Boat seat, buoyant. G Perkins.
Bone black kiln. J T Trory.
Book, check or voucher. D A McIntyre.
Book, order. J P Brownlee.
Booth, portable. J W Arnest.
Bottle corking machine. S B Smallwood.
Bottle filling apparatus. S B Smallwood.
Bottle filling machine 2. S B Smallwood.
Bottle safety closing device. R P de Sen-
nevoy.
Brake shoe. W D Sargent.
Brick. H Lottie.
Brick kiln. P Gonder.
Brush. W Wallach.
Bulldog roll. H A Webster.
Burner for burning gaseous fuel. J F
Hewitt.
Button, covered. A M Longee.
Calf box, magnet. C E Scribner.
Calister and measure. G R Conually.
Car brake. C Keiner.
Car brake. P Leen.
Car, convertible fruit. D E Barton.
Car coupling. W W Cuthbreath.
Car coupling. O Hood.
Car door. I V Kelly.
Car door operating mechanism. A M King.
Car ventilator, railway passenger. J Kech-
rich.
Cabineting apparatus, air. W C Clark and
A B Griffen.
Carriage 2. C N Bennett.
Carriage, transformable. J E W Schuricht.
Cash box. W C Simmons.
Cash register. C J Passick.
Cash register and indicator 2. W E Brooke.
Cash register and indicator. J P Cleal.
Casting machine, type 3. G H Ziegler.
Chair. G A Kollenberg.
Chair fanning attachment, rocking. O
Drake.
Chalk lines, self chalking. J Wilson.
Chlorin monoxid, apparatus for the manu-
facture of. G A Cannot.
Churn, etc., automatically operated. M S
Thomas.
Churn dasher. J E Finley.
Clipper, lawn. E W McGuire.
Cloth sponging cylinder. R K Colson.
Clothes drier. P Jodoin.
Cock for air brake systems, stop. J C Mc-
Nabb.
Coffee pot. W D Wells.
Coffin lid fastening and hinge. L G Kregel.
Collapsible box. J Jowett.
Combustion apparatus. E F Paddon.
Commutator for dynamo electric machines.
E Thomson.
Concentric clamp. J Riddell.
Conveyer, screw. F Prinz.
Conveying machinery. D C and T W Sac-
man.
Cork finishing machinery. J Lowman.
Corks, machine for making hollow. F C
Truslow.
Corn from cobs, machine for cutting. W S
Plummer.
Crushing or grinding mill. R E Schill.
Cultivator. M W Beard.
Cultivator. N Maxfield, R F Griffin and H

A Speer.
Curling irons, gas burner attachment for
heating. W H Wellpot and O F Boellner.
Currents, method of and apparatus for trans-
forming alternating into continuous. J F
Kelley.
Cutting tool for granite etc. W C Young.
Cyclometer. J Butcher.
Dumper, stove. E C Cole.
Die. C Wagefuhr.
Dimethylpiperazin tartrate. C Stochr.
Dough from cereals, process of and appa-
ratus for the production of. F I Gelinck.
Dust inhibitor. J L King.
Dye, black. R Vidal.
Dyeing apparatus. E Masurel.
Eaves trough hanger. D Soames.
Electric distribution and generation, system
of. E J Houston.
Electric light filaments, material for mak-
ing. G A Cannot.
Electric machine, magneto. E Tilmann.
Electric motor. J F Denison.
Electric switch. J F Kester.
Electrical conductor. G H Blakesley.
Electrical connection cord. A H McCulloch.
Electrolytic cells, diaphragm for. C N
Waite.
Electroplating, process of and apparatus for.
C M Barber.
Elevator controlling device. A N Atkins.
Elevators, automatic stop device for hydrau-
lic. H R Smith.
Engine. K Mosericki.
Ethyl chloride, etc, receptacle for. J Beugue.
Exhibiting device. W C Fawkes.
Explosive, smokeless. F G du Pont.
Eyelet for vehicles, curtain. C D Dickerson.
Feed roll, sectional. W S McCay and L V
Moulton.
Fifth wheel. D Wilcox.
Fire alarm. J J Orvis.
Fire escape. B Fox.
Fire escape. F Kopp.
Fireplace front. J F Hewitt.
Flag holder and cane, combined. N Smith.
Floor construction, metallic. G B Francis
and E P Dawley.
Floor jack. J L Kobler.
Fluids, apparatus for indicating the flow of.
H S Maxim.
Forging or hammering metal, machine for.
L A Parrock.
Furnace. J J de Kinder.
Furnace. S M Trapp.
Furnace. J W Upson.
Fuse for projectiles, percussion. W J Dnu-
gan.
Galvanic battery. G Hewett.
Gachage can. S Lebach.
Garment and belt, combined military. E
Rice.
Gas, apparatus for manufacturing. F Mayer.
Gas, apparatus for the manufacture of. E
R Ellsworth.
Gas meter. O C Pudan and L B Fulton.
Gate. J F Fervis and W M Thomas.
Glass brick and manufacture thereof. L
Oettinger and M Schreiber.
Glass rolling apparatus. A D Brogan and A
M Malloch.
Glycerin and salt from spent soap lye, recov-
ering. E K Mitting.
Governor and reversing gear, engine. H H
Kelley.
Grader attachment, road. W E Sullivan.
Grain drier. I G Hooper.
Grain drill cleaning attachment. E J Kem-
per.
Grain scouring or polishing machine. G W
Mead.
Grip block. G S Fouts.
Guitar. L F McKennus.
Gun, bomb. F W Lusecomb.
Gun, water power machine. P B Tyler.
Guns, ejector for breakdown. G A Sachs.
Hand rest, chiropractor's. W T Smith.
Hatchway guard, elevator. J W Birdwin.
Hay carrier track and its connections. M G
Grosscup.
Hay loader. C E Lindstrom.
Hay press. S W Bricker.
Hinge, furniture. R F Collins.
Hoof weight. F D Scott.
Hoof for barrels, etc. H S Hooper.
Horse driver and governor. H A and C S
Arnold.
Ice cutting machine. T Cutter.
Inhaler. J F Chesbro.
Ink well, fountain. W S Russell.
Insulator, electric railway crossing. H B
Nichols and F H Lincoln.
Jar fastening, preserve or fruit. F W and P
C A Hofmann.
Jar top straightener, fruit. J T Pinnell.
Joint and bearing. W C Rarig.
Key ring. P L V Thier.
Kitchen cabinet. W Halaron.
Knitting machine, circular. J L Eck.
Ladder. J Schade.
Lamp, electric arc. W E Frost.
Lamp, incandescent electric. J E Craggal.
Lamp, incandescent electric. W E Forest.
Lamp support, electric. J J Renchan.
Lamps, manufacture of incandescent elec-
tric. H D Burnett and S E Deane.
Lantern attachment. P O Martin.
Lantern globes, manufacture of. F W Stew-
art.
Latch. J G Lane.
Level. J Habel.
Level 3. J A Traut.
Liquid gage. A R Welch.
Liquid separator, centrifugal. C L Chap-
man.
Loading machine, dirt. E Fourman.
Log loading and turning machine. W E
Hill.
Logging system. R Lamb.
Loom for weaving narrow fabrics. J O
Fryer.
Mechanical movement. F W McArdle.
Metal wheel, cast. J Yocom.
Milk treating apparatus. R Larkey.
Mold cooler. H T Winters.
Molder or former. F W McArdle.
Molder's flask. L W Boutelle.
Mowing machine. W A Knowlton.
Music, etc., apparatus for turning leaves of.
E Richardson.

Music leaf turner. M D Ferrin.
Nozzle, spraying. J Steel and J Busha.
Nut lock. J R Cribbs.
Nut lock. W L Worland.
Nut lock washer. W B McMaster.
Oil can. F D Winkley.
Ore crusher. J R Gordon.
Oven, bake. J J Ptenninger.
Oven regulator. M A Williams.
Packing, piston. M D Kilmer.
Painting device, wire. J B Whalen.
Paper box making machine. H D Stone.
Paper box making machine. H D Stone and
C Thibodeau.
Paper stock, process of and machine for
making spools or hollow articles from. H
Fairbanks and H Parker.
Pen, fountain. E G Peck and F O'Meara.
Pencil tip pin attachment. T E Ogram and
H L E Johnson.
Pianoforte. P Anderson.
Pianoforte. J A Weser.
Pick, etc., Miner's. C Camm.
Planter and cultivator, combination. J W
Moore.
Flow riding attachment. W E Stallord.
Plow, wheel. S D Poole.
Pocket book guard or fastener. A Saripkin.
Pole and neck yoke connection for vehicles.
H L Kingsley.
Poles and shafts, extension piece for com-
bined. H Broomie.
Powder receptacle. A P Thompson and W
B Murray.
Precious stones, tool for grinding or polish-
ing. A Neydeck.
Printing block 2. F I Getty.
Printing block, chromatic. F I Getty.
Printing device, chromatic. F I Getty.
Printing press, platen. W H Price Jr.
Pulp separator, wood. E F Millard.
Pump. T Parker.
Pump, double acting. C Rodenbaugh.
Punch, ticket. J Dudley and R E Gibson.
Puzzle, educational. S P Ferree.
Race bulletin and displaying device. J W
Fleming.
Rail. W T Manning.
Rail bond, electric. J G Hallas.
Railway bonding joint, electric. A L Johns-
ton.
Railway, conduit electric. J W Eisenhuth.
Railway, conduit electric. C D Jenney.
Railway, electric. H A Doty.
Railway guard rail, street. G F Stark-
weather.
Railway signal. H M Abernethy.
Railway supply system, electric. W A But-
ler.
Railway supply system, electric. E H John-
son and R Landell.
Railway supply system, electric 2. E H
Johnson and R Landell.
Railway switch point, street. H S Smith.
Railway system, electric. R M Hunter.
Railway tie anchor, metal. R E Daniels.
Regenerating furnace. S M Trapp.
Regulating device, automatic. J W Upson.
Rein guard. C Allen.
Rein, quadruplex neutral. C D Haskins.
Riveting machine. J J Unbehend.
Rolling mill rolls, attachment for adjusting.
C Townsend.
Rope or wire holder. E P Slentz.
Rotary steam engine. J N Hartzell.
Rotary steam engine, reciprocating. F W
Reeves.
Ruler, parallel. C H Beeler, Jr.
Sad iron. W J Platt.
Sash fastener. J B Morgan.
Sash fastener. G Voil.
Saw guide, gang edger. C H Upton.
Saw machine, drag. J W Caled.
Sawmill carriage. E E Thomas.
Sawmill carriages, piston rod connected for.
C H Upton.
Saw mill, circular. U S Sjostrand and C J
Anderson.
Saw mill feed. C Reiser.
Saw rounder, circular. J H Lynch.
Scale and screw jack, combined spring. B
Lobee.
Scale, platform. H L Fisher.
Scanning machine, can. W Wagner.
Separating and purifying machine. J La
Croix.
Sever, refreshment. M Gaul.
Shade roller bracket. C F F Flos.
Shears operating mechanism. E A Cochran.
Sheet metal tubes, method of and machine
for making. F A Juergens.
Shield. T Keely.
Ship's light and air port. T Ulley.
Shoe patterns from lasts, machine for des-
cribing. W H Baynard, Jr.
Shoe polisher. H Parsons.
Shutter operating device. C W Enquist.
Signal box, electric 2. W W Hibbard.
Signal system, differentiating apparatus for
electric. W W Hibbard.
Signaling apparatus, electric 2. W W Hib-
bard.
Skate plane. W B Lynch.
Sleigh and wagon, combined. A Czora, C
K Ernst, Jr., and C J Dornbrack.
Smoke consuming apparatus. L Hallbauer.
Snow ploy, railway. J Kallauer.
Sole leveling machine. E C Judd and F W
McArdle.
Sole rounding machines, knife holder for. L
E Ericson.
Soot preventing composition. R Givens.
Speed gearing. J J Mann, J H Smith, and
H G Read.
Spike puller. L M Shattuck.
Spinning and twisting frame ring. G O
Draper.
Spinning jenny. G H Marsh.
Spring motor. S B Wortmann.
Stave jointing machine. G Mills.
Steam boiler. G H Drake.
Steam boiler, sectional. H M Norton.
Steam engine. E Gschwind.
Stool, folding. F L and F A Joy.
Stove, hydrocarbon. A Rosenzweig.
Stoves, vaporizer for gasoline. G W Billings.
Structural metal work. A Krause.
Stump extractor. C N Blood.
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Telegraph operator's order case. J A Hinson.
Telephone transmitter. T Grissinger.
Thermstatic alarm. C Ontriss.
Thill coupling. G N Pearson.
Thrashing machine band cutter and feeder. W Taylor.
Thrashing machine self feeder and band cutter. D Harper.
Thread package. B L Armstrong.
Tire, pneumatic. R S Anderson.
Tire, pneumatic. J B St. and J B Dunlop, Jr.
Tire, pneumatic 2. T B Jeffery.
Tire upsetting or shrinking machine. J R Little.
Tire, wheel. T B Jeffery.
Toaster or broiler. J A Miller.
Tooth regulator. E H Angle.
Top, solar. J Adams.
Trace trimmer and finisher. P H Schoonmaker.
Trolley. J Gzowski.
Trolley conductor, electrical. J W Eisenhuth.
Trousers strap. G B Adams.
Trousers stretcher. C W Lambin.
Truck, roller bearing. G W Bacon.
Truck, basket. R M Sprague and J F Rutter.
Truss. C H Chapman and W S Goodhue.
Twine for binding grain. F R Williams.
Twine for grain binding harvesters. F R Williams.
Twine, making. F R Williams.
Type writing machine. J N Williams.
Valve mechanism for liquid receptacles. F C Wilson.
Valve, rotary. H V Loss.
Vapor burner. C H Childs.
Vehicle gear. J M Bromley.
Vehicle wheel. N D Penoyer.
Velocipedes, variable speed and power gearing for. A B Stedens.
Vise, pipe. G F Haven.
Wagon, dumping. L E Johnson.
Waist. C A Burgess.
Washing machine. E C Burt.
Washing machine. J G Crawford.
Watch, stem winding and setting. N T Mills.
Watches, guard for slides of repeating. G E Humbert.
Water, apparatus for obtaining distilled and sterilized. J Nagel.
Water heater. A H, F J, and H S Humphrey.
Water heater and range, combined. I N Hall.
Water motor. E B Benham and H E Barlow.
Water motor. J E Lewis.
Weigher, grain. G Anderson.
Wheel. W A Orr and B S Reynolds.
Wheel rim clip. C S Dikeman.
Wind motor. A Lancaster.
Window, cellar. L Tremmel.
Window screen, adjustable. W Lash.
Wire crossover. L S Amos.
Wire tightener. C H Dickinson.
Wood graining machine. G Pelstring.
Wrapping table, bundle. C Spira.
Wrench. C Tinglof.
Wrench. G Trakoller.

PATENTS GRANTED JULY 24, '94.

Acid, sodium sulfate, magnesium sulfate, etc., obtaining carbonic. E W Enequist.
Addressing envelopes and wrappers, machine for. C A Belknap.
Amalgamating machine water jet. A W Robinson.
Amalgamating machines, amalgam trough and water supply pipe for. A W Robinson.
Amalgamating machines, tailings discharge apparatus for. A W Robinson.
Amalgamator. J L Hayward and A W Robinson.
Amalgamator screen bearing. A W Robinson.
Awning worker. J A Gillin.
Axle spindle, vehicle. W M Barnes.
Barrel heater. J B and W H Stanhope.
Bars, rails, etc., machine for straightening. H Wick, Jr.
Basin, bath, etc., wash. F Adee.
Bed, couch. W S Bowie.
Bed, lounge. C W Vogel.
Bed or crib. M E Converse.
Bed, sofa. J H Phillips and F C Feldman.
Beer carbonating apparatus. C Barus.
Bicycle. M L Wilcox.

Bicycle saddle. R T Torkelson.
Bicycle seat. A L Girard.
Bicycle speed indicator. E Boulter.
Billiard or pool register. C W Goetze and A Knopp.
Blower. C Runley.
Boiler. C L Seabury.
Boiler flue cutter. E Pember.
Boot or shoe attachment. J H Johnson.
Boot tree. H L Lee.
Bottle stopper. O G Ahlstrom.
Bottle stopper 2. L Kalling.
Bottles or other glass articles, apparatus for the manufacture of. J B Verway.
Bottling machine. H Wending.
Box fastener. L Leber.
Brake mechanism. J T Macdonald, Jr.
Bridle bit. E E Withey.
Buckle. D F Dalton.
Buckle. D L Smith.
Buffing machines, abrasive cover for. A W Rogers.
Buildings, construction of. J M Cornell.
Butter molding and cutting device. L L Mivelaz.
Butter, producing sterilized. G Muller.
Cableway. T S Miller.
Can feeding machine. H R Stickney.
Can filling machine. H R Stickney.
Car brake system. N Lombard.
Car coupling. L T Backus.
Car coupling. H L Dunlap.
Car coupling. J T Lampp.
Car fender. C R Hall.
Car fender. F S Hogg.
Car fender. E J Smith.
Car guard, street. C A Barrett.
Car heating apparatus. J F McElroy.
Car, railway. H W Libbey.
Car replacer. R E Alexander.
Car transm. T C Salvator.
Carbonating column. J R and H. Watson.
Carling machines, rub motion mechanism for condenser. E Kay.
Carpet beating machine. J L Leach.
Carpet sweeper. G H Gere.
Cash recorder and indicator. E H Muller.
Cash register. H A and W C Miles.
Cash register and indicator. J P Cleal.
Cash registering machine. J J Webster.
Cement, manufacture of. B K Rigby.
Chain bar sewing machine. O Klatte.
Chain link, drive. C E Hart.
Chain shackle or coupling. R J Rae.
Chains, rolls for the manufacture of. O Klatte.
Checkrein. A W Cox.
Christmas tree holder. E Pruckner.
Chuck. C M Conradson.
Cigar boxes, match box and cigar cutter attachment for. C Myhre.
Cigar bunching machine. J De la Mar.
Cloth folding machine. J E Whittle.
Clothes ponder. J J Sheehy.
Coke oven. T and J Cummings.
Coke oven. A D Shrewsbury.
Collar and hames, combined. F D Pelletier.
Combustible material. E Scott.
Cooking utensil. S M Hoagland.
Cooking vessel. J F Pack.
Copying, damping apparatus for press. W S Mendenhall.
Crane, hydraulic. W L Scaife.
Crate, folding. W H H Mulford.
Crib, folding. F J Ebert.
Cultivator tooth. A V Ryder.
Deaf mute instruction, apparatus for. G A Leach.
Desk and form, school. A Marsch.
Dish cleaner. E A Couch.
Door check. E E Punzelt.
Door controlling device. J J Kinsey.
Doubing webs of fabric longitudinally, mechanism for. E T and E H Marble.
Downdraft kiln, combination. F W Dennis.
Dry air closet. G R Scates.
Dust collector. A Heine.
Dyeing. M E Waldstein and A H Peter.
Dynamos on car trucks, mounting. W Bidle.
Educator, question and answer. W R Fearn.
Ejecting apparatus. A Kluger.
Electric motor controlling mechanism. C H Richardson.
Electric motors, starting and controlling device for. J W Moore.
Electrical converter. R H Hassler.

Electricity converter. F A Broeg.
Elevator gate and door. C B Jones.
Embryotome. C Hinted.
Emery wheel attachment. W E McGennis.
Engine indicator, steam. H A Spiller.
Engines, electrical igniting device for gas. A J Painter.
Engines, gas heater for internal combustion. W S Elliott, Jr.
Exhibitor, coin controlled surface. V P DeKnight.
Fan attachment for swings, etc. C M Sherer.
Fare register and recorder. C S Sergeant and L J Hirt.
Feed water heater. H Blake.
Feed water heater and cinder consumer. G F Hirt.
Feed water heater and purifier 2. E G T Colles.
Feeder for animals, time. J A Michael.
Felly cutting machine, wagon. J P Walter.
Fence. W H Hanson.
Fence stretcher, wire. C F Corns and S W Jenks.
Fence, wire. D Hershey and H Buck.
Fences, machine for weaving cross wires in wire. F W Shellabarger.
Filter discharging device. G H Moore.
Filter, purifier and grease trap, feed water. W Reeves.
Fire plug casing, tool for cutting recesses on the inside of. H Thomson.
Flood gate, automatic. J W Milligan and J A Tomlinson.
Floor board set. G A Stewart.
Floor cloth, machine for the manufacture of mosaic. F Walton.
Floor mill air bolt. J S Dodge.
Fruit cleaning machine. T H Bell.
Furnace. E Jolicard.
Furnace for burning refuse matter. T P Mahon.
Fuel, composition of matter for artificial. E Nienstaedt.
Gage and finger guard, combined. A T Snell.
Garment clasp. G Bradshaw.
Gas meter. C W Hinman.
Gas meter, coin freed. J Hawkyard.
Gas, method of and means for charging and combining fermented or unfermented liquids with carbonic acid. E Adam and M O Reibuss.
Glove, boxing. O A Burton.
Glove or garment fastening. E Ridgway, Jr.
Grip slot closer. F W Gremmels.
Gun, breakdown. F A Hollenbeck.
Gun carriage, disappearing. W B Gordon.
Hanger. W and B Trewhella, Jr.
Harrow. G Burkhardt.
Harrow, disk. J C Eamer and J P Feyereisen.
Heater. R H Laird.
Heating forced draft. T M Rymer Jones.
Hydrant, street. H Thomson.
Hinsory apparatus. A Lake.
Ironing board. J H Kinley and W P Shney.
Journal box for dredging or like machinery. A W Robinson.
Kettle. J J Kuek.
Kiln for burning pottery, clay, etc. R Heilmann.
Kite. E E Thayer.
Lace fastener. E A Pumyea.
Lamp, electric incandescent. F M F Cazin.
Lamp holder, adjustable incandescent. S E Nutting.
Lamp, incandescent electric. F M F Cazin.
Lamp, multiple filament. A L Clough.
Lamps, working arc. W S Horry.
Lantern, dark. V Groom.
Lasting machine. C W King.
Lathe, turret. C M Conradson.
Lanuch, naphtha. C Gould.
Lifting machine. D Nelson.
Loom warp slackening mechanism. G F Hutchins.
Lumber handling apparatus for drying kilns. H G Wadley.
Mail marking machine. F N Ethridge.
Match box and ash receiver, combined. T Schafer.
Meat mixing machine. J H Schaefer.
Metal bending machine. J B and J J Schneider.
Millstone. M Ams.
Minnow bucket. L W and W H Hemp.

Mold plates, process of and bath for hardening. L E Brown.
Molding machine. W W Doolittle.
Mosaic, vitreous. L E Tonnell.
Music, turner, sheet. B F Wallace.
Nail machine feeder. E J Smith.
Needle, ribbon. F Kohlmann.
Note indicator. P O Carroll.
Nut lock. E P Kendall.
Nut lock. H Schwalbe and H G Schneider.
Nut lock. J Thimmes.
Oil engine. H Campdell.
Ordnance, device for inserting or removing tubes in. M Gledhill.
Ordnance, pressure gage for use on heavy. A G Meady.
Ore roasting furnace. H C Rudge.
Organ. E E Brock.
Organ, reed. A J Reynolds.
Panoramic camera. F F Dumke.
Parts guard. J H Collister.
Pasting machine, paper. T C Dexter.
Pattern, trousers. J G Nickamp.
Peach screen. J P Wilson.
Pen, fountain. J Janka.
Pencil holder. R W Irwin, Jr.
Pencilulator, electrically propelled. E E Keller.
Photograph coin operated mechanism. G E Tewksbury.
Photography by artificial light. B M Glindist, Jr.
Pipe coupling, flexible. J A Lynch.
Pipe joint, steam or water. J A Parhydt.
Pipe wrench. S Kreisher.
Planter. C E P Hobart.
Planter, corn. J Selby.
Planters, anchor for check row. J Valentin.
Plug, fasible. C G Ludlow.
Plush, etc., means for preventing creasing or folding. A Hox.
Pneumatic dispatch systems, receiving and dispatch box for. L G Bostedo.
Pneumatic dispatch tube. L G Bostedo.
Power, apparatus for regulating hydraulic. R H Thrope.
Power transmitter. J A Johnson.
Precision stones, machine for cutting. G Armeny.
Press for plastic material. E Jonkan.
Printing press color attachment. G L Lawrence.
Projectiles, means for measuring the penetrative force of. H Brunswig.
Punching and riveting machine, combined. J Bann.
Pyrotechnic compound. J Agostini.
Rail straightening machine. H Wick, Jr.
Railway crossing gate tube. W L Dodge.
Railway system, electric. A C Crehore.
Railway tracks, construction of. T H Gibbon.
Railways, apparatus for automatic fog signaling on. H F Clark.
Ramic or like material to fibre, reducing. J P A Baye.
Razor honing machine. W H Mather.
Refrigerator car. F E Canda.
Refrigerator car. H B Plant.
Refrigerators, cooling. T Schiedler.
Roasting furnace. J Roger.
Roofing, vegetable fiber. G McTeer.
Rope laying device. E M Ivens.
Rudder lock. H L Bowdoin.
Sand molds, apparatus for forming. S J Adams.
Sash balance. L Huntington.
Sash fastener. N Johnson.
Sash lock and burglar alarm, combined. J F Buschmann.
Saw set. D A Arnold.
Scales, self register for weighing. O Raney.
Scales, weigh hopper for platform. F W Bond.
Screen. G W Cross.
Screw driver. J Swan.
Seal. E J Sturtevant.
Secondary battery. A E Peyrusson.
Sewing machine. J Haas and R Lintz.
Sewing machine. F Lichtfeldt.
Sewing machine. H F Nason.
Sewing machine loop taker. P Diehl.
Sewing machine, oscillating hook for 2. P Diehl.
Shade fixture, adjustable window. F E Wagner.
Shade hanger. A M Bergerer.

Shelf roller, book. P J Pauly, Jr.
Ship. A Forster.
Silt. G F Pooley.
Shoe lastening. C C Eisenberg.
Shoe, turned. W Gordon.
Signal system, block. G L Thomas.
Siphon. R Thayer.
Strips, apparatus for making. R H Humstock.
Slates, putting colored lines on school. W A Stocker.
Slop jar mouthpiece. L W Seville and W W Dornin.
Snow plow, electric. L J Hirt.
Spice receptacle. T W Bradford.
Spinning frame separator. A E Rhoades.
Spout for vessels. L C Kinsey.
Square, steel. J G Zuck.
Square, stone worker's gage. J H Gorman.
Steam engine. R Garstang.
Steam engine reversible. F Lester.
Steam generator 2. T L and T J Stuttervant.
Stopper. J L Miller.
Store service. L G Bostedo.
Stove top. W G Price.
Stretching block. A Muller and L Schulz.
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Switch operating device. H H McKee.
Switch stand. C Partington.
Syringe. J Hardman, Jr.
Tea kettle. C F Ebling.
Teapot, coffee pot etc. F Hancock.
Telegraph, signal. C V Boughton.
Telephone. S D Field.
Telephone switch. J O Ziegler.
Testing machine, centrifugal. F Huger-sholt.
Thill coupling. W D Turner.
Thrashing machine. W H Bowen.
Thrashing machine self feeder and band cutter. W F Hall.
Tile, roofing. A Kayser.
Tin plate cleaning and polishing machine. G J Record.
Tire, elastic metallic. G Wadzel.
Tire, pneumatic. G C Moore.
Tires, device for inflating pneumatic. R H Rice.
Tobacco and snuff receptacle. C P Geritz and F H C Stamm.
Tooth crowns, forming. J G Hollingsworth.
Tooth pick machine. W F Hutchinson.
Top. H R T Collin.
Torpedoes, machine for placing track. S Myers.
Track clearer. O Rothrock.
Trawl line. W T White.
Tricycle. E Herrington.
Trolley catcher. E M Drummond.
Trousers clasp or guard. G A Tower.
Truck. B Goldensky.
Type writing machine line spacing device. C W Corey.
Valises, etc., attachment for. A H Allerhardt.
Valve for oil wells, check. E Evans.
Valve, straightway. E H Luken.
Vapor burner. E Kells.
Vehicle brake. D L Miller.
Vehicle warming device. J Broderick.
Vehicles, top box or rack attachment for. L H Hansen.
Velocipede pedal and crank. N Rubinstein.
C Onley, and E Clarke.
Vending machine, coin controlled 2. J P Tirrell and J W Willard.
Veneer cutting machines, stripping attachment for. W F Hutchinson.
Veneers, manufacturing. C Koster.
Vessels, device for the protection of. W H Baily, Sr.
Waist, garment. L Coatney.
Wall fastening. G Leicht.
Wash tub. O Brueck.
Washing machine. E O M Habacker.
Washing machine. F J Merrow.
Water gage, safety. F L Wolfe.
Wheel. H S Glick.
Whilltree. W R H Spradin.
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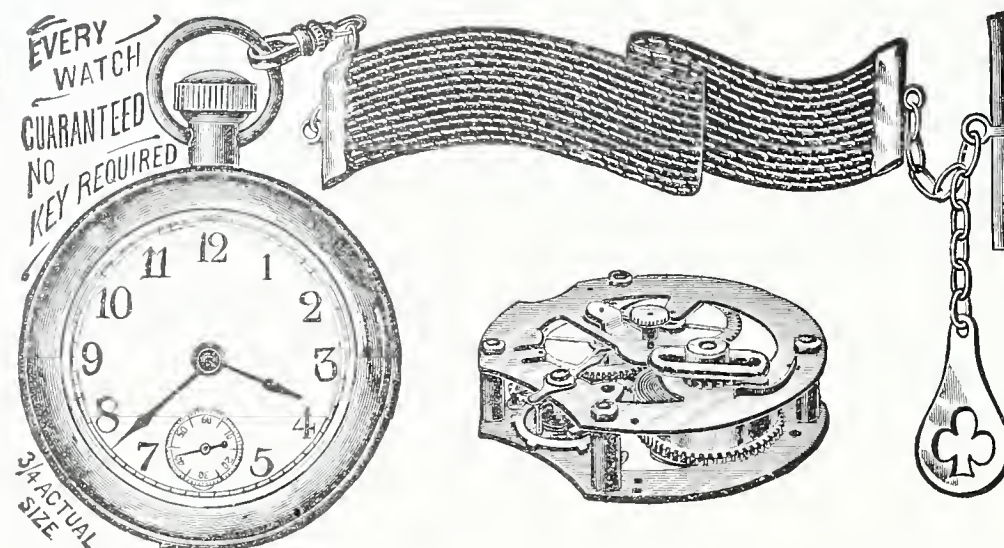
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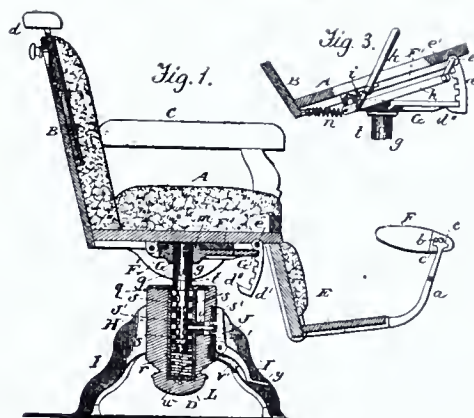
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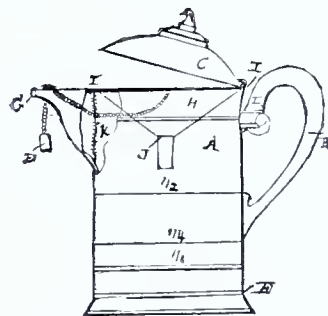
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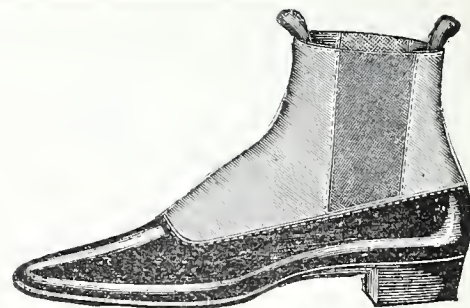
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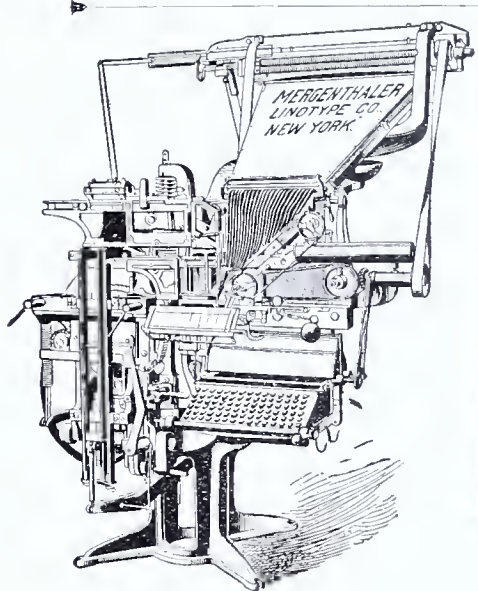
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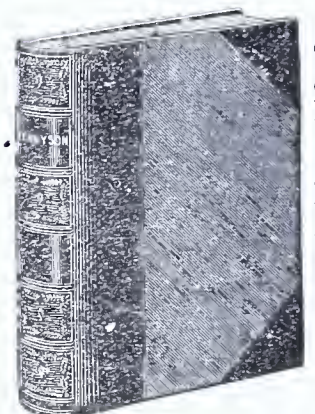
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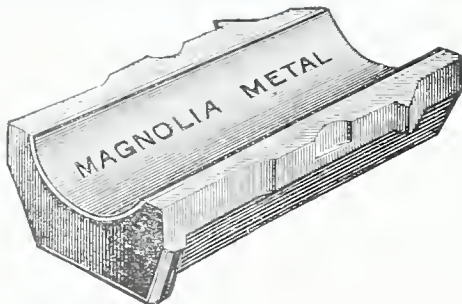
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Fifth Year.
No. 9.

WASHINGTON, D. C., SEPTEMBER, 1894.

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Departed Glory of the World's Fair.

It will be with feelings akin to sadness that visitors to the World's Fair, will look upon the four views presented herewith. Those upon whose minds was indelibly photographed the pleasing ensemble of the great "White City" by Lake Michigan, will regret to have that picture marred by a realization of the present condition. Nothing now remains but a shapeless mass of blackened ruins, a maze of twisted iron and broken columns, a picture of desolation and departed glory. On the evening following

nificent tower and sculptures, as if unable to bear the sight of destruction, leaped inwardly upon the fiery mass, falling in twelve minutes after igniting. The Mining and Electricity buildings and the Machinery Hall by this time were seething masses of flames, followed by the Liberal Arts, and before the material gave out all that was left of the White City were the Government, Fine Arts and Transportation buildings. The fire department was powerless and could only devote its attention to saving the Art building, now the Field Columbian Museum. While

the government building at the Chicago World's Fair, worth \$400,000; \$50,000 to move it and put it up, and \$150,000 for the exhibit itself, making \$600,000 benefit, besides the stamp of the nation on the enterprise, which secures foreign co-operation and guarantees the success of the big movement.

The Problem of Large Gun Construction.

Getting high muzzle velocity without destructive chamber pressure is the problem in the construction of large guns, says American Machinest. The skill



Machinery Hall, Looking East.
Liberal Arts, Looking North (Government Building in Distance).

Liberal Arts, Looking Southeast (Hide and Leather in Distance).
Agricultural Building (Colonade in Background)

THE WHITE CITY: A TRANSFORMATION SCENE.

the general pyrotechnic display of July 4th last, the torch of the incendiary was again applied, as it had been on several occasions previous, to the vulnerable portions of the deserted palaces and in a few moments the most brilliant, the most stupendous and the most extravagant transformation scene ever presented lighted up the heavens of the city by the inland sea. The most enthusiastic pen has failed to describe the awful scene with befitting reality.

The fire originated in the terminal station and spread to the Administration building, whose mag-

all mourn the loss of these relics, none can feel other than that the end, though awful in its grandeur, was far more fitting and appropriate than the work of vandal wreckers.

The Atlanta Exposition.

President Cleveland's approval of the national exhibit for the Atlanta Cotton States and International Exposition puts that great project squarely on its feet, and makes it an American affair in the fullest sense of the word. Congress gives the exposition

of the mechanic has been taxed to about the utmost to provide strength for the gun. Now the skill of the chemist is taxed to devise a powder that shall burn just right to accomplish the end aimed at. The starting of the enormously heavy modern projectile without danger to the gun, and the gradual increase of velocity up to the muzzle, all the time avoiding danger, is the problem, the solution of which is being ardently sought at the present time. Glory, and money, too, lies in the direction of the successful effort to more easily destroy human life.

The Inventive Age

Established 1889.

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WASHINGTON, D. C., SEPTEMBER, 1894.

IN another column is published an interesting article on the piracy of patents in various countries from the pen of George G. Turri, one of the leading patent attorneys of Melbourne.

HERR OTTO LILIENTHAL, the German engineer who perfected a flying machine on the principle of the wings of a bird, evidently didn't fall upon the right idea, for it is reported that at a distance of 100 feet from the ground the "flying man" lost control of his wings and fell to the ground with such force as to discourage, on his part, any immediate intention of further attempts at mechanical flight.

It has been figured out by experts that eleven years is the life of the average steel rail and that renewals should amount to something like 1,700,000 tons yearly. For several years the economy of railroad managements has not sanctioned renewals to anything like the natural requirement, and it is therefore anticipated that marked activity in the steel rail industry will be inaugurated this fall.

A COMPANY of American prospectors recently opened up an iron ore mine at Belle Isle, Conception Bay, Newfoundland. It is reported that they are working in the interests of the Whitney syndicate, which is operating the Cape Breton coal mines, and that its chief encouragement was in the position of President Cleveland in favor of free iron ore and the belief that the Wilson, instead of the Gorman tariff bill, would be enacted into law.

THE July and August wheat exports were disappointing and unless September shows an improvement in this respect the American wheat grower will not profit much by this year's crop. The exports for July, this year, flour included, was 11,631,057 bushels, against 19,124,963 bushels for the same month last year. The movement from the western farms is large, nearly double that of last season, and something like 40,000,000 bushels are now in store in Duluth and other lake ports. The outlook for "good prices for wheat" is not good.

THE final adoption of a tariff measure by Congress is a great relief to the business world. The new law is far from satisfactory to the industrial and manufacturing interests of the country; but there is an inclination to look upon the bright side of its prospective effect and make the best of it. The relief from a long period of uncertainty will compensate in a measure for the inconsistent and unwise provisions of the new law, and the enforced idleness of hundreds of manufactories will be at an end. The abridgement of the protective features will have the tendency to reduce the wages of mill operatives commensurate with any reduction in price of manufactured products that may be neces-

sary on account of foreign competition which will show as an object lesson to those who incline to the belief that free trade in practice will be as satisfactory as free trade in theory.

REPORTS from the test at Sandy Hook of the rapid firing pneumatic guns of the Pneumatic Torpedo and Construction Company make, indicate greater success than had been anticipated. From the 15-inch gun in a period of fifteen minutes ten shots were fired and the action of the fuse and the aim were astonishingly accurate. Three dummies were first fired at to obtain the range, and afterward eight loaded 10-inch projectiles, each containing 200 pounds of nitro-gelatine, were fired from the 15-inch gun, and all struck the water apparently in the same spot. The range was 3,500 yards. Two-second time fuses were used, and they acted perfectly, exploding every shell.

Report of Commissioner of Patents.

Under date of August 22d, the Commissioner of Patents submits a report of the business of the Patent Office for the fiscal year ending June 30, 1894. Briefly it shows the following:

<i>Applications and Caveats received.</i>	
Applications for letters patent	35,952
Applications for design patents	1,050
Applications for reissue patents	108
Applications for registration of trade-marks	1,720
Applications for registration of labels	368
Applications for registration of prints	8
Caveats	2,193
Total	41,399

<i>Patents granted and Trade-Marks, Labels, and Prints registered.</i>	
Letters patent granted (including reissues and designs)	22,546
Trade-marks registered	1,656
Labels registered	2
Prints registered	2
Total	24,204

<i>Patents withheld and Patents expired.</i>	
Letters patent withheld for non-payment of final fee	4,566
Letters patent expired	13,167

<i>Receipts and Expenditures.</i>	
Net receipts from all sources	\$1,183,523 18
Net expenditures (including printing and binding, stationery, and contingent expenses)	1,053,962 38
Surplus	129,560 80

<i>Balance in the Treasury of the United States on account of the Patent fund.</i>	
June 30, 1893	\$4,279,805 94
June 30, 1894	129,560 80
Total	4,409,366 74

<i>Applications awaiting action.</i>	
Number of applications awaiting action on the part of the Office on July 1, 1894	7,076

<i>Comparative Statement.</i>		
	<i>Receipts.</i>	<i>Expenditures.</i>
June 30, 1890.....	\$1,347,203 21	\$1,081,173 56
June 30, 1891.....	1,302,794 59	1,145,502 90
June 30, 1892.....	1,268,727 35	1,114,134 23
June 30, 1893.....	1,288,809 07	1,111,444 23
June 30, 1894.....	1,183,523 18	1,053,962 38

<i>Applications for Patents, including Reissues, Designs, Trade-Marks, Labels and Prints.</i>	
June 30, 1890	43,810
June 30, 1891	43,616
June 30, 1892	43,544
June 30, 1893	43,589
June 30, 1894	39,206

<i>Applications awaiting action on the part of the Office.</i>	
June 30, 1890	6,585
June 30, 1891	8,911
June 30, 1892	9,447
June 30, 1893	8,283
June 30, 1894	7,076

Summarizing the tables showing the number of patents issued prior to July 1894, it is shown that there were received in the fiscal year ending June 30, 1894, 35,952 applications for patents; 1,050 applications for designs; 108 applications for reissues; 2,193 caveats; 1,720 applications for trade-marks, and 368 applications for labels. There were 22,546 patents granted, including reissues and designs; 1,656 trade-marks registered, and two prints registered. The number of patents which expired was 13,167. The number of allowed applications which were by operation of law forfeited for non-payment of the final fees was 4,566. The total expenditures were \$1,053,962.38; the receipts over expenditures were \$129,560.80, and the total receipts over expenditures to the credit of the Patent Office in the Treasury of the United States amounts to \$4,409,366.74.

Patents in France during 1893.

In France there were made during the year 1893, 8,627 applications for patent, and 1,535 for certificates of addition, in all 10,162 applications. There were granted 8,356 patents and 1,501 certificates of addition. The greatest number of inventions in any one art was in velocipedes, in which 771 patents and 152 certificates were granted.

World's Fair Notes.

The Bureau of Awards has about completed the work of preparing the language of diplomas and sending official copies of same to fortunate exhibitors. Some 24,000 copies of these have been made in duplicate form. The original is forwarded to the exhibitor and the duplicate retained by the Bureau for use of the printer when inserting the findings of the individual judge and jury in the diploma form. The large force of clerks required to do this work has been reduced to about ten, and other reductions will follow as fast as the various departments close up their duties.

The plan of sending advance copies of what each diploma would contain was to enable exhibitors to know the language of their awards and give them an opportunity to have their names and addresses correct.

Exhibitors by this time should be quite familiar with the plan of bestowing awards. Exhibits at the fair were arranged by groups and classes. If an exhibitor received an award in any group the award carried with it one medal and one diploma. If he received two awards in one group, but one medal is given with two diplomas, provided the awards are in separate classes; but if the awards are in only one class, one medal and one diploma covers the entire award. In other words, each successful exhibitor is entitled to a medal and diploma in each group, and if he received awards in more than one class in any one group, additional diplomas will be given for each separate class, provided there be more than the original one.

Following is a copy of a circular card that is being sent in answer to inquiries of exhibitors as to what will constitute their awards, and when they may expect to receive the medals and diplomas:

"Each exhibitor receiving an award is entitled to a medal and a diploma. If the exhibitor receives more than one award he is entitled to a medal and diploma for each separate group and a diploma for each separate class.

"The preparation of the medal and diploma is in the hands of the Honorable the Secretary of the Treasury and this Bureau has no responsibility in the matter until they are ready for distribution, when they will be sent out at the earliest possible moment."

Note for Inventors.

Under the above caption "The Practical Farmer," one of the leading and most reliable agricultural papers in the country, says:

The great and increasing interest in the southern cow pea in more northern sections, and the great increase of the use of the dry peas as a ground food for dairy cows are both operating to increase the culture of this crop for the seed in the south. So long as the culture was confined at home and there was little demand for the seed, farmers could afford to gather and thresh by hand what they needed for seed. But now conditions are altered. Northern farmers are experimenting with the plant, and are writing south for the seed, and if the interest continues to increase all the seedmen will be compelled to keep this seed in stock. Said a southern farmer a few days ago: "I have 800 bushels of one variety of peas growing under contract for seedmen, and unfortunately it is one of the latest and hardest to thresh. Now, can you not stir up some of our ingenious men north to invent machines for harvesting and threshing our field peas. This is just what the southern farmer now needs, and American ingenuity ought to overcome the difficulty. When once the immense value of these ground peas is fully understood by northern dairymen, the demand for the cow pea will grow apace. With the difficulties of harvesting and threshing overcome, the southern farmers can grow them at figures which will compel their use as dairy food. With the present slow and expensive hand work the price must keep up to make it pay. The machinery used for beans north would hardly answer for these peas without great changes. Here is room for profitable invention, and the man who first produces an effective pea harvester and cleaner will reap a large profit.

It is a very significant statement of the fact that farmers fully appreciate the value of inventions and are perfectly willing to pay inventors fair profits for their labors, and is additional proof that the alleged hostility of agriculturalists to the patent system is due to the incessant clamor of scheming politicians in their attempts to secure the votes of farmers. The southern farmer's appeal to the "ingenious men of the north" to invent a new threshing machine is quite natural in view of the fact that the proportion of patented inventions made by citizens of the northern and southern states is ten to one; but if the south will include the development of its inventive ingenuity in its great advance in prosperity the remarkable disproportion will be greatly lessened.

NOTES AND NEWS.

Ancient Aqueducts.—The Turkish government is about to rebuild Solomon's water conduits, at Jerusalem, at a cost of \$400,000.

* * *

A Monster Stone Slab.—There was recently quarried near West Hurley, N. Y., a slab of 9 inches thick and 20x24 feet in size. This is said to be the largest stone ever brought to tide water.

* * *

Niagara's Power for Canada.—The power plant on the Canadian side of Niagara Falls has been begun by the Canadian Niagara Falls Power Company. It will be similar to that on the American side and have three turbines, with provisions for three more.

* * *

The Maxim Flying Machine.—Mr. Hiram S. Maxim, commenting on some remarks that have been made in connection with his recent experiments, says: "It is known now to be possible to make a machine that will actually fly at a very high velocity; so nothing remains to be done except to manoeuvre it."

* * *

Largest Sailing Vessel in the World.—A contract for what is said to be the largest sailing vessel in the world has been recently given by a Hamburg firm to J. C. Tecklenborg, a Bremerhaven shipbuilder. The vessel will be constructed of iron and will have five masts. Her dimensions are to be as follows: Length, 365 feet; breadth, 50 feet, and depth, 31¼ feet.

* * *

Painting the Great Forth Bridge.—The painting of the Forth Bridge, which is certainly no light undertaking, is again in progress. So vast is the structure that it takes somewhere about fifty tons of paint to give it one coat, the area that has to be dealt with being something like 120 acres. It is said that about 200 trains pass over the bridge every twenty-four hours.

* * *

The Transatlantic Record Broken.—The greyhound *Campania* has reduced the transatlantic record on the westward run to five days, nine hours and twenty-nine minutes, covering 2,783 knots at an average speed of 21.49 knots an hour, a record that is three hours and eighteen minutes better than that of the *Lucania*, her sister ship, which was the queen of the seas until the *Campania* wrested from her that proud title.

* * *

Wonders of Reproduction.—Many species of bacteria are capable of doubling their number every hour. In this case, in the short space of 24 hours a single bacterium would increase to a number but little short of 17,000,000—to be exact, in 48 hours the offsprings of this minute germ—which is not more than 1-15,000 of an inch in length—have increased to the surprising number of 281,500,000,000, their bulk being sufficient to fill a pint measure.

* * *

Largest Saw Mill in the World.—It has been generally supposed that the largest lumber mills in the world were located on Puget sound in this country, but such is not the fact. The largest mill, so far as known, is in Christiana, Norway, where one million feet is produced daily. There are about thirty gang saws and six planing and matching machines, the latter of the massive Norwegian design which feed at the rate of 80 to a 100 feet per minute. The consumption of timber in Great Britain alone is 3,700,000,000 feet a year, and the forests of Norway are estimated as good for 500 years to come.

* * *

First Inventor of the Electric Fan.—Mr. Schuyler S. Wheeler, of the Crocker-Wheeler Company, claims to be the inventor of what London Public Opinion is pleased to call "this handy toy." Early in 1886 he suggested turning a small sewing machine motor upside down, replacing the yoke of the magnets with a piece shaped like a tripod stand, and attaching a sort of propeller to the armature shaft. A specimen was made and shown, and orders at once came in for others like it. It is estimated that there are now nearly a quarter of a million of these little room ventilators in use in America, but very few have yet found favor in Europe.

* * *

The New Atlantic Liners.—The steamers "St. Louis" and "St. Paul," now building by the Cramps for the International Navigation Company, are the largest vessels ever constructed in America, their dimensions being: Length over all, 554 feet; length

on load water line, 536 feet; extreme breadth, 63 feet; molded depth, 42 feet; tonnage, 11,000. Each boat will be propelled by twin screws, each driven by a quadruple expansion engine having cylinders 36, 50, 71 and 100 inches in diameter and stroke of 60 inches. They will develop about 10,000 indicated horse power each. A speed of 20 knots an hour is expected.

* * *

What Paper is Made Of.—Paper is one of the most lavishly used articles of modern times. The materials of which it can be made are almost as numerous and common as the uses to which the finished article is put. There are something over two thousand patents covering the making of paper. It may be manufactured, under some one of them, from the leaves of trees; from hop plants, bean stalks, pea vines; from the trunks and stems of Indian corn and every variety of grain; from moss, clover and timothy hay, and more than one hundred kinds of grasses; from straw and cocoanut fibre; from fresh-water weeds and sea weeds; from sawdust, shavings and asbestos; from thistles and thistle down; from banana skins, tobacco stalks and tan bark; from hair wool, fur, old sacking or bagging, and from almost any other imaginable refuse.—*Kate Field's Washington.*

* * *

To Prevent Suffocation in Mines.—Prof. J. S. Haldane recently read a paper to the British Association on "The Causes and Prevention of Suffocation in Mines." The professor argued that most of the men killed in explosions were not killed at once by the explosion, but that an interval elapsed during which means could be adopted for preservation. He exhibited a small apparatus he had constructed, which could be enclosed in a small tin box, which would keep a miner alive for three hours if he remained in a sitting posture, and for one if he walked about. This would enable anyone to penetrate the layer of after-damp and reach the open air. It consisted of a cylinder containing compressed oxygen and a layer of material for absorbing the carbonic acid given out by the breath, and could be turned on by a tap, the miner breathing through a tube into a bag. Still another method of preventing fire-damp disasters has been proposed by a Frenchman. He proposes to ignite the gases by electricity before the miners enter the shaft.

* * *

Aluminum on Glass.—L'Industrie states that M. Charles Margot of the University of Geneva has found that by rubbing on glass with an aluminum point we obtain clear metallic lines, which cannot be removed by washing, no matter how often repeated. This property which aluminum possesses, of adhering closely to glass, or in general to any substance having silica as a base, is most plainly shown when the surface is dampened or covered with a very light coat of moisture, as, for instance, when a man breathes upon the surface of the glass. An indispensable condition is that the glass and the aluminum point shall be clean. It is known that magnesium, cadmium and zinc have similar properties, and that they will leave visible traces on glass. None of these metals, however, possesses this property to the same extent as aluminum. On the other hand, besides the fact that aluminum oxidizes very quickly, the traces which it leaves on glass vanish quickly, and therefore the metal can be used for this purpose only under special circumstances. Many applications can be suggested for aluminum in this direction. It can be used instead of the engraver's tool in cutting designs on glass. With the aluminum pencil diamonds can be distinguished from imitation, since it will make no mark on a diamond.

Americans Settling in Mexico.

Consular advices received at the Department of State warn Americans against emigrating to Mexico with a view to permanent settlement with insufficient means, or without informing themselves, in a reliable way, as to the prospects for earning livelihoods. While there are undoubtedly good opportunities in Mexico for enterprise, frugality, and thrift, it is, like other countries, a land of varying conditions, and it often happens that disappointment is the result of emigration undertaken upon insufficient or misleading information, or without resources, which are always necessary to success in a new country. Many Americans have been induced by alluring statements as to the cheapness of coffee raising, etc., to emigrate to Mexico within the past year, and some have lost their all by so doing. For these reasons, consuls desire to caution Americans against the representations of speculators, who are always on the watch for the unwary.

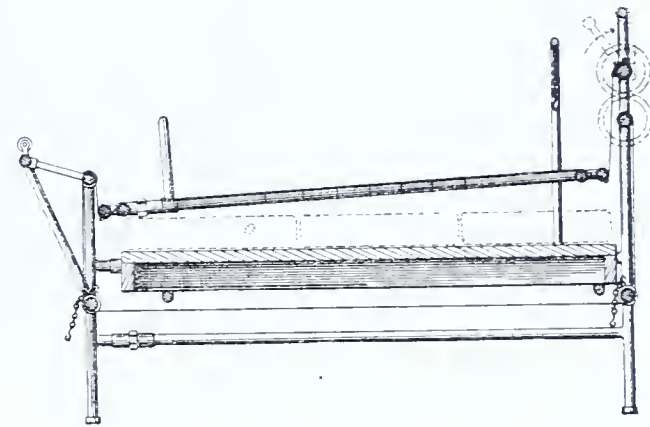
The Helander Hospital Bed.

Mr. Alexander Helander, of Los Angeles, Cal., has secured letters patent for the improved hospital bed shown in the illustration. While technically known as a "fracture bed" it is so constructed as to be readily adjustable to general hospital uses. Arranged between the front and rear legs of the bed are side bars two to a side, one above the other with turn buckles for varying the length of the bed.

The bed posts are also connected by cross bars on which a series of small sleeves or rollers are placed, and on the ends of these cross bars are hooks carrying chains. Journaled in suitable bearings in the upper ends of the bed posts are two parallel shafts, one above the other. On the upper shaft is secured a cogwheel which meshes with a similar wheel slidingly secured on the lower shaft by means of a spline. Located on the upper shaft, a short distance from the cogwheel is a ratchet wheel with which a pawl engages. A canvas belting, having one end attached to the lower shaft, passes under the lower cross bar of the head board, thence to the foot board around the under and upper cross bars thereof, thence to a frame, attached by suitable means to the side bars of the bed frame, and thence to the upper shaft on the bed post.

This belt is firmly secured to the side bars of the frame by lacing, and about its center has an opening for inserting a vessel.

In operation, where it is desired to raise the head of the invalid the chains are adjusted to engage the proper link with the hooks of the movable frame; the handle is then adjusted to the upper shaft which is then rotated winding the canvas thereon, elevating the forward end of the movable frame until the



chains are drawn tight, the chains retaining the movable frame in a fixed position against lateral movement. While the shaft is being rotated the cogwheel is moved out of engagement with the cogwheel so that the lower shaft is held from moving. If it is desired to place the movable frame on a level plane the handle is adjusted to the lower shaft and the canvas is wound thereon until the rear end of the movable frame reaches its proper position. The movable frame will now be held throughout in an elevated position above the mattress, and is locked in this position by forcing the upper cogwheel into engagement with the teeth of the lower cogwheel and allowing the detent to engage the teeth of the ratchet wheel. While the patient is held in the elevated position on the movable frame the mattress may be moved and the necessary receptacle placed below the opening in the canvas. The bottle may also be removed while the frame is in its elevated position for the purposes of fumigating or cleansing.

Suitable means are provided for supporting the coverings of the bed and to prevent them from coming in contact with the patient. A simple device also provides means whereby the patient may exercise.

A pulley having a suitable shank on its support which is adapted to pass through apertures in the cross bar is provided.

To this a suitable cord is adapted to pass over the pulley and carry a weight at its lower end, its opposite end being attached to the injured member of the invalid for the purpose of resetting dislocated joints.

The bed has been tested in the hospital and has met with unqualified success.

The patent was obtained through Crosby & Dorian, patent attorneys, of Washington, D. C.

Patents in Great Britain for 1893.

The annual report of the Comptroller-General of the British Patent Office shows that during the year 1893 there were deposited 25,120 applications for patent against 24,171 in 1892. The report shows that the practice of filing applications accompanied by complete specifications is on the increase, while every year shows an increased number of those with provisional specification abandoned for the lack of the complete specification within the legal period. It is expected that the new building which is to constitute the south wing of the Patent Office will be completed during the year 1894.

The Simonds Steam Wagon.

The new steam wagon, lately invented and patented by Mr. C. L. Simonds, of Lynn, Mass., is undoubtedly the first really practical steam wagon ever invented although hundreds of thousands of dollars have been invested in failures.

The carriage weighs 437 lbs., being constructed of iron and steel mostly, with bicycle wheels 36 and 48 inches in diameter, with solid rubber tires, making running perfectly noiseless. The boiler is of the porcupine type with 28 square feet of heating surface. Engine is vertical with link motion and two cylinders with the cranks set at 90 degrees the power being carried to rear driving-wheel by chain and spocket. There are two pumps; one for feeding the boiler with water from tank holding ten gallons, and one for supplying the naphtha tank with air; naphtha being used for fuel through five large burners, which can be used singly if desired. This tank holds five gallons of naphtha, about what would be required for 100 miles run. The exhaust steam passes through a feed water heater to a perforated coil of pipe in the combustion chamber into the naphtha flame, destroying all noise and increasing the heat. The wagon is hung on three elliptic springs, makes steam in five minutes, and faster than can be used, climbs hills easy with two people, runs ten miles an hour on ordinary roads, has steam gauge, water glass, safety valve, clock, whistle, scarcely any smoke from stack, carries 100 lbs. steam, steers by wheel in front of seat, is perfectly safe and any person can handle it at first sight.

A Simple, Low Priced Time Recorder.

The New National Time Recorder Co., of Milwaukee, Wis., has put on the market, in addition to the "Bolte Automatic" and Autographic Recorders, its latest style recorder, which the firm has called "The American."

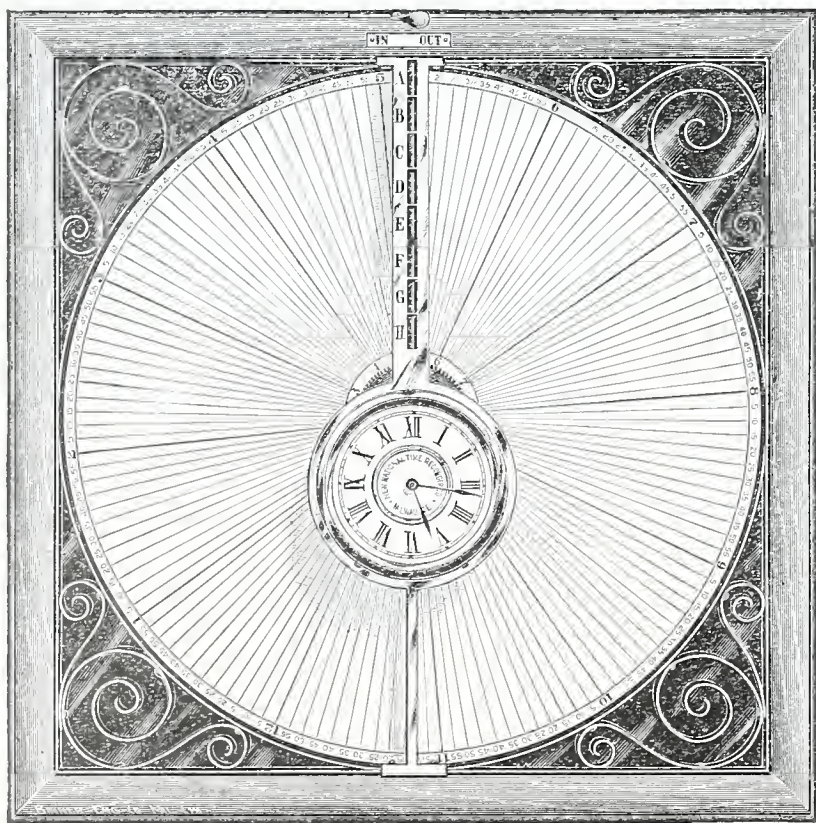


FIG. 1.

Cut No. 1 shows the complete recorder, which will take a 21 inch record dial. Cut No. 2 shows a portion of the record dial after a day's registrations have been made. The heavy lines are hour lines and the lighter ones five minute lines. Thus, it may be seen at a glance any time during the day, by the

employer or any one interested, that No. 2 is fifteen minutes late, No. 9, ten minutes late, and No. 10 is absent, not being registered.

By a novel arrangement, the numbers come consecutively on the record dial and the key, or check, (fig. 3) will enter only the hole for which it is intended. A slight pressure on the key will ring the bell and indicate that registration has been made. The arrival of employees is indicated by the numbers appearing in red and the departure in blue. This is accomplished by moving a small lever above the key holes at the front of the clock, either to IN or OUT. This lever shifts the record ribbon through which the registrations are made.



THE SIMONDS STEAM WAGON.

The recorder referred to above, will register 10 employees; however, by using a number of recorders, which is generally preferable in large establishments, as many as 1000 can register, the numbers coming consecutively.

Something New in Electricity.

A novel electrical device has been perfected by a Washington inventor. It consists of a window opening and closing device, by means of which the win-

dows of a building may be operated from any convenient point by a switch. The window frame is also supplied with a pair of switch keys, one of the keys opening and closing the top sash, while the other key similarly operates the lower sash. A child can manipulate the keys if necessary and thus open or close either sash, while

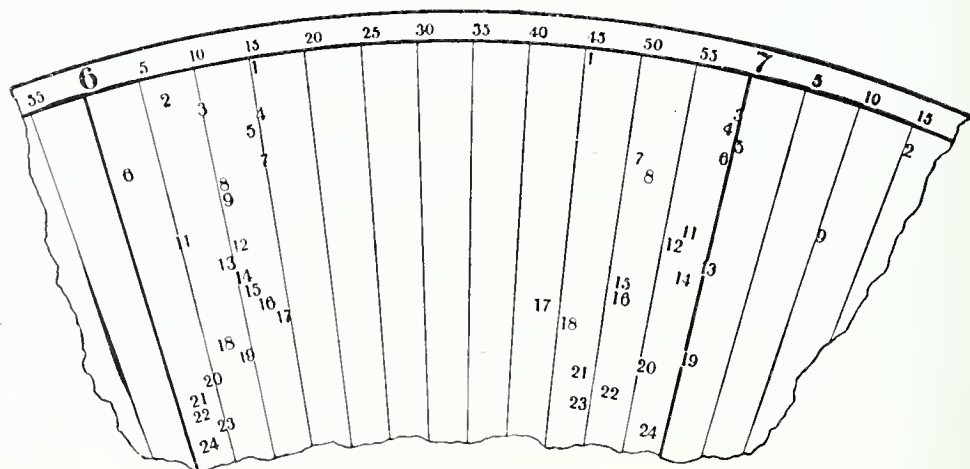


FIG. 2.

length. It also goes round a curve of 35 feet radius on a 1-in-27 grade. Its weight, when filled with passengers, is 5½ tons. For gas, it costs 2 cents per mile, against 7 cents per mile for fodder and bedding for horses; so that the gas motor car starts with an advantage of 5 cents per mile. The performance of the car is quite satisfactory."

A New Atmospheric Gas.

A cable dispatch states that Lord Rayleigh and Prof. Ramsay have announced the discovery by them of a new element in the atmosphere. It is a dense and remarkably inert gas twenty-one times heavier than hydrogen and 50 per cent heavier than nitrogen. The spectrum is new, showing a single blue line much more intense than the corresponding line in the nitrogen spectrum. It constitutes about one per cent of the atmosphere.

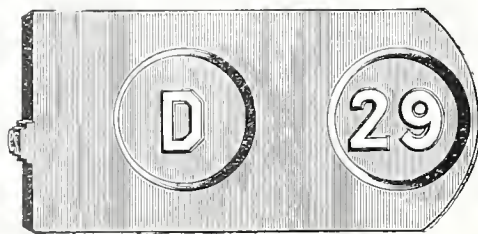


FIG. 3.

at the same time, in case of sudden storms all the windows of a building may be rapidly closed from the lower floor, or any other convenient point, without the usual visit to each window.

Moreover, the apparatus is specially adapted for use in large halls or churches, where the janitor or

sexton may at any time operate any or all of the sashes to regulate the admission of air, without disturbing the speaker, the mechanism being almost noiseless.

Besides this, a thermostat, properly connected in circuit with the device, may be employed to open or close the upper sash to regulate the temperature of the apartment. The sashes are always locked when stationary, in every position, so that a window partly open for the admission of air cannot be raised for entrance by unauthorized persons on the outside. This locking device also serves as a safe guard against accidents from breakage of the sash cords.

The invention is readily applied to any windows without refitting the frames and the current necessary to operate the mechanism is only slightly in excess of that used on the gas lighting circuits now in common use.

One of the important points of the invention is that the cost of manufacture will be low enough to put the apparatus within the reach of all of ordinary means.

With slight changes the apparatus may be employed to operate fans, lights or transoms.

Gas Motors for Street Cars.

The original German inventor having died, an English syndicate recently acquired the patents on the Luhrig model of gas motor for street cars and such marked improvements have been made, that the United States Consul-General at Frankfort calls the attention of this country to the fact. A car of this improved type is now worked regularly on the lines of a tramway company at Croydon, near London, and has attracted expert attention from all parts of Great Britain, where the problem of street-railway equipment and management is quite as complicated and difficult as in any portion of the United States. Ordinary illuminating gas is used, condensed to a pressure of 10 atmospheres, and the reservoirs under the floor of the car, which can be filled through a flexible pipe within the time required to change horses, carry gas enough for a run of 8 or 10 miles. The editor of Engineering thus speaks of it:

"The car is not noticeably different from a horse car. It runs quietly and easily, emitting neither smoke nor steam, and is quite under control. Inside passengers can hear a slight rumble of machinery and perceive a trifling vibration; but, after a minute or two, these are unheeded, and practically, there is nothing to detract from their comfort. Neither they nor the bystanders in the street car perceive any machinery whatever, for the engine and gearing are entirely enclosed, the motor lying under one seat and the wheels and clutches under the floor of the car. * * * It carries twenty-eight passengers in all and makes a very fair speed, the limit allowed by the board of trade being 8 miles per hour. With the slow gear in action, it will readily mount an incline of 1-in-23, with a short piece of 1-in-16, and in coming down, it can be stopped by the brake in its own

Electric Pioneers.

It has been no great length of time since the adaptation of the electric light to modern uses was made perfect by Edison, and the economic utility of the motor established beyond question. Yet the evolution of electricity in its various forms began its triumphant march toward future perfection, nearly three hundred years ago. Electromagnetism was known to the ancients as early as the fourth century; for we learn that in 413 a bishop, named Elmerus made experiments in magnetism, and in 370, we have a striking illustration of the adaptation of the magnetic influence of metals. The following curious account is from Maimbourg's *History de l'Arianisme*, (Paris, 1686):—"Whilst Valens, the Roman emperor, was at Antioch in his third consulship in the year 370, several pagans of distinction, with the philosophers who were in so great reputation under Julian, not being able to bear that the empire should continue in the hands of the Christians, consulted privately the demons by means of conjuration in order to know the destiny of the emperor, and who should be his successor, persuading themselves that the oracles would name a person who should restore the worship of the gods. For this purpose they made a three-footed stool of laurel in imitation of the tripods at Delphos, upon which, having laid a basin of divers metals, they placed the twenty-four letters of the alphabet round it; then one of these philosophers, who was a magician, being wrapped up in a large mantle, and his head covered, holding in one hand vervain and in the other a ring which hung at the end of a small thread, pronounced some execrable conjurations, in order to invoke the devils; at which the three-footed stool turning round and the ring moving of itself and turning from one side to the other over the letters, it caused them to fall upon the table and place themselves near each other, whilst the persons who were present set down the numbers in their table-books, till the answer was delivered in heroic verse, which foretold them that their criminal inquiry would cost them their lives, and that the Furies were waiting for the emperor at Mimas, where he was to die of a horrible kind of death, (he was subsequently burned alive by the Goths); after which the enchanted ring turning about over the letters in order to express the name of him who should succeed the emperor, formed first of all these four characters, T-h-e-o; then having added a "d" to form THEOD, the ring stopped and was not seen to move any more; at which one of the assistants cried out in a transport of joy. 'We must not doubt any longer of it; Theodorus is the person whom the gods appoint for our emperor.'"

Although the manner of conducting this prophetic deception is not clearly demonstrated, it was undoubtedly accomplished by the means of electromagnetism.

Down the long stretch of time from 1600 came the makers of electrical history, of whom were Gilbert, of Colchester, who invented the word electricity, from the Greek word *electron*, amber; Otto von Guericke the inventor of the sulphur globe; Hawksbee, inventor of the glass cylinder; Grey and Weller, who were the first to transmit electricity from one point to another; Dufay who first discovered the two kinds of electricity and the fundamental principles of their action; Boze who used a globe of glass for his machine and furnished it with a prime conductor, and Winkle who was the first to use a fixed cushion in that machine.

One year after the Leyden jar was discovered, (1746) Benjamin Franklin showed its electric conditions, and five years latter proved by his kite the similarity between electricity and lightning. While Canton, Wilke, and Aepinus were examining the nature of induction, and Ramsden was constructing the first plate machine, Franklin was deep in his scientific work; and in 1772-3, while in London, invented an electric light which he could read by, thus giving to his country a scientific honor so magnificently perpetuated by Edison a hundred years later.

The principle of Franklin's ancient machine (which was brought to light in London some months ago) is that of the arc light without carbon points. Light was produced in a glass cylinder, which had at one end a metal point and at the other a ball. Each end of the cylinder was connected with the positive and negative poles of the generating machine, and light was made by the intercepted current leaping from ball to point. The generating apparatus was one of the most powerful of its time and consisted of a large glass cylinder turned by a crank and rubbed by silk-covered brushes which collected the electric fluid and conveyed it to the conductors, which were sustained by heavy glass columns. Though not up to the present mark of finish and

beauty, it is said this old veteran lightning maker is capable of doing the work of modern machines, as far as power is concerned. Only a few years ago the generating machine was used at South Kensington to illustrate lectures, and for many years after Franklin had ceased to benefit mankind by his work, it was used. But the old relic has been used sparingly by its present possessor—and it should be, for around it cling the memories of a statesman, philosopher and genius of the first order.

Nairn with his two fluid cylinder machine, Volta with his electrophorus and condenser, Galvani, Conlomb, Sir Humphry Davy, Faraday and Armstrong, stand out in their respective lights as pioneer discoverers, to whom the world owes much. But the progressive American mind loves to think of the man who drew the lightning from the clouds, and of whom a writer has said: "His hypothesis of a single electric fluid subsisting in positive and negative states, marked a turning point toward the modern science, and his demonstration of the identity of lightning and electricity outranks in popular and scientific interest every experiment before or after, prior to the discovery of current electricity by Volta and Galvani fifty years later."

Priestly says of Franklin's theoretical works:—"His principles bid fair to be handed down to posterity as equally expressive of the true principle of electricity with the Newtonian Philosophy of the true system of nature in general."

Down the ages the mysterious throb of nature's most potent force has come knocking at the intellectual doors of man, flashing from mind to mind, gathering new impetus at each step of its journey, until the world beholds the spirit of active nature harnessed to the wheels of progress. It will be king of the earth and the sea, and the unstable bosom of the atmosphere will yield a support in obedience to its touch.

As the earth and the human body move by electric force, so will man make this force his universal servant.

JAMES EASTUS PRICE.

Women as Inventors.

By EDWARD P. THOMPSON, M. E.

Below are given a few opinions of noted writers who, fortunately and certainly are speaking of past generations, rather than the present. Goncourt says, "There are no women of genius—the women of genius are men." Prof. Lombroso, of Italy, and author of "The Man of Genius" modifies this slightly by asserting: "In the history of genius, women have a small place." Hamerton, in his "Intellectual Life" compares the scarcity of women inventors to the rarity of bearded women, but wisely praises the former and deplors the existence of the latter. None of these writers could possibly have investigated the Patent Office records of the past few years, nor have watched the rapidly increasing number of patents granted to women during succeeding years. By counting up the number of patents granted to women in the United States alone since the birthday of Abraham Lincoln, the records show the astounding total of three thousand and three hundred women patentees.

Hon. John W. Daniels, Doctor of Laws, because thoroughly versed in the matter of patented inventions, has naturally a much higher opinion of woman's capacity for inventing, for he said, at the Patent Centennial Celebration: "Woman's intuitions are proverbial; and when she turns them to mechanical invention, the possibility of genius surpasses the scope of prophecy." As long ago as 1000 B. C. her power to overcome difficulties (and this is inventing) was recognized by Solomon, when he said: "She looketh well to the ways of her household." The successful housewife is continually called upon to plan and invent useful and original ways and means for saving time and money.

Omitting the notion of mere quantity, the genius of woman is equal to that of man in quality, and it is therefore deserving of high honor. The woman who stands at the head in quantity is Lavinia H. Foy of Worcester, Mass., to whom have been granted ten patents from 1863 to 1878. To Elizabeth S. Weldon of New York City were issued five patents all on the same day in 1876, and a few more later.

Mary Kies is the queen of American inventors, for her's is the first name in the patent record; unless Agdalena S. Goodman of Florida deserves the honor because the first American born woman to get a patent a few years later. The former obtained a patent in 1809 upon the process of weaving straw with silk or thread. She lived in Killingly in Connecticut. The records of her patent at the Patent Office were destroyed by the great fire of 1836, and have never been restored. From one of her descendants, Marietta Kies, the author learns that Mrs. Madison, wife of the President of the United States at about that time expressed her gratification by a complimentary note to Mrs. Kies because of her genius

shown by the graceful fabrication which she added to the other industries of New England.

A descendant of Mrs. Kies now lives in South Killingly, Conn. His name is George W. Pike and he furnishes the following interesting reminiscence: "Her maiden name was Mary Dixon and she was born in Killingly about 1750. My father was her oldest son, born in 1771. Mrs. Kies outliving her first husband, married again and had been married about thirty years when she received her patent. It was a patent for weaving straw, which was an extensive industry in the Killingly section at that time.

The first patent granted to a woman, the records of which have been restored was issued to Emma Steinhauer in 1831 for a cook stove.

Agdalena S. Goodman's invention was unique. In Florida, and other parts of the South, brooms were very expensive, and this woman directed her attention to the possibility of using some of the plants or grasses of the tropics. At last, she succeeded in applying to this purpose, the branches of that class of the palmetto, called the cabbage palmetto tree. She constructed the brooms in such a manner that the trunk or one of the branches of the tree became the handle of the broom.

An instance of foreign women inventors is that of Marie Louise Roucout, of Paris, who in 1853 was the first to provide grate bars of furnaces with airholes in order to obtain the more complete combustion of the coal, and greater economy.

At the beginning of this century, Elizabeth Metcalf of Massachusetts invented a straw hat without any knowledge of the state of the art in Great Britain, and instructed operators how to manufacture the hat in large quantities. They sold well in surrounding towns. The records show no patent granted to her. She originated the idea of weaving the hat from straw and of bleaching it with the vapor of burning sulphur. The Rhode Island "Society for the Encouragement of Domestic Manufactures" has preserved an exact fac-simile of the hat of Mrs. Baker (her married name). In this same line, and shortly after, Sophia Woodhouse, later Mrs. Wells of Connecticut, invented a hat made of ticklemoth, a meadow grass. She sent samples to the Society of Arts, in England. The London Merchants pronounced the bonnets far superior to the best grades of Leghorn, and recommended the importation and cultivation of the grass for the purpose of adequately supplying the market. The society awarded her a silver medal and twenty guineas in return for some of the seed and a description of her process for treating the grass. The patent records show that she received letters patent to protect her invention. It was the fourth woman's American patent.

Lucy Burnap at about the same time, 1823, found a suitable grass and invented an especial treatment and obtained a patent. They were in such demand that one sold at \$50 in Boston at an auction.

By the older readers of this periodical, it may be remembered that the letters a, b, c, d, etc., were once used as musical notes instead of the present pear shaped characters. The use of letters was the invention of a woman, namely Abby S. Smith, of Rochester, New York, who obtained a patent in 1856.

American and German Inventors Compared.

"The patent laws of the United States are the best in the world, just as the inventive genius of Americans is ahead of that of all other nations," declares Mr. M. J. Hallo, a patent lawyer of international reputation, a German by birth, but a naturalized citizen of this country.

"Comparing the United States and Germany," said he, "it is much cheaper to get out a patent here. Then there are taxes to pay over there every year on patented articles, which are not taxed in this country. Besides if an invention is not operated or utilized within two years after a patent is granted in Germany the rights of the owner lapse. This feature works such a hardship that a great many American inventors refuse to take out patents in Germany."

"There is another thing, too, that must be said in favor of Americans. They are always inventing something useful and practical. The bent of American inventive talent is all that direction. Our German inventors, on the other hand, are more or less dreamy and impractical, trying all the time to produce some wonderful concern, which, if worked out according to the inventor's ideas, would scarcely ever have any commercial value. The graphophone is an excellent illustration of Yankee ingenuity and utilitarian habit. In Europe it is still looked on as something of a toy, and they have no idea of the daily business use it is put to over here. I am going to take back a few of them when I cross the Atlantic this time and show the Berliners how slow they are."

THE steamship war has finally resulted in a \$10 steerage rate between New York and leading European ports. The result is that the emigration new about equals the immigration.

The Culture and Manufacture of Ramie.

The question of the cultivation of ramie in this country is not a new one, but the increased demand for fabrics of all kinds made from its fiber adds additional interest to the matter at this time. In all the stores of the land the manufactured products of ramie are placed along side of the products of linen, wool and silk—sold for silk-worm silk and only an expert can detect the difference—while jute and hemp are sold for ramie. The fiber produced from the ramie plant is the strongest in the world, being three times stronger even than Russian hemp. It is about as fine as silk and will make either the strongest cordage and coarse goods, or the finest and most beautiful cloths, hangings, table linen, tapestries, clothing, etc. It readily mixes with wool or silk and can be woven with all other fibers. It takes the most beautiful dyes, and is more lasting and durable than the strongest linens or finest silks.

But three things are necessary to the development of the ramie industry in this country—and the wonderful possibilities and prospective benefits to the agricultural interests to accrue therefrom must soon overcome all obstacles: Governmental encouragement, investment of capital in manufacturing plants and the application of inventive genius in the perfection of machinery (in the work, not before it), for the treatment of the fiber, are the important requisites of success. If this industry can be developed the manufacture of this fiber in the United States will be a source of wealth to the farmers of the country greater than any one of their present products.

Mr. S. H. Slaughter, of San Francisco, who is now in Washington endeavoring to interest Congress and capital in the subject, is one of the most enthusiastic promoters of the enterprise in this country and has devoted several years to the study of the value of ramie, the various uses to which it can be put and also its cultivation, preparation and manufacture into goods. He declares that ramie will grow luxuriantly anywhere on the Pacific coast or from the warm, dry soil of New Jersey to the Gulf. It will produce crops that are simply enormous. From 18,000 to 20,000 pounds per acre are possible on soils where two or more cuts are made. Where irrigation is used and long seasons prevail three to four cuts per year are possible. It is easily grown and handled, needs very little cultivation, and does not exhaust the soil. The machinery for reducing it to a condition suitable for delivery to the factory is simple and inexpensive, and, Mr. Slaughter maintains, that a few farmers could readily club together to purchase machinery, or a plant, capable of working up their joint crops, or a company can purchase machinery and run it for them, and they would be employed several months of the year by judicious arrangement of the cutting.

The whole world has long had a deep interest in the manufacture of ramie fiber, and numberless efforts have been made to simplify its preparation, so as to bring about its more general use. So far the most of its production and manufacture has been in China and India by hand labor, and in Europe their product has in late years been largely used in adulteration of silk, where labor is so cheap that it can be handled successfully. In Europe strenuous efforts have been made to introduce machinery into its preparation, with more or less success, and the same is true of this country.

It is estimated that some \$30,000,000 worth of worsted and much more wool and woolen goods, as well as \$19,000,000 worth of silk, is imported into the United States annually. Ramie fiber, that can be grown in this country, can take the place mostly of this, and largely with our own product of wool and silk, equal or excel much of it in durability and finish. There is no end or limit to the possibilities, apparently, of the uses to which it can be put.

Ramie is now grown in China, Japan, India, Mexico, Cuba, Hawaii, Samoa, West Indies, Guatemala, Columbia, and Brazil, and (in the United States), in Florida, Georgia, Alabama, Louisiana, Texas, California, and Washington in small quantities. It is also grown in South France, Italy and Hungary. It is worth in China \$50 to \$80 per ton, cleaned by hand. This is done there by scraping the pellicle off the outside of the stalk, cut green, then peeling the bark, and with a bamboo stick rubbing out the mucilaginous gummy matter over a log, and repeated boiling, washing, and drying on scaffolds or roofs of their houses. For export it is only partially ungummed. For their hand weaving they strip this partially ungummed fiber into threads as long as possible, containing, of course, thousands of fibers held together by gum (saving the operation of combing and spinning), which they fasten, stick or tie together end to end, making long threads in imitation of silk, which they weave into goods by hand, then boil and bleach out and color in the piece.

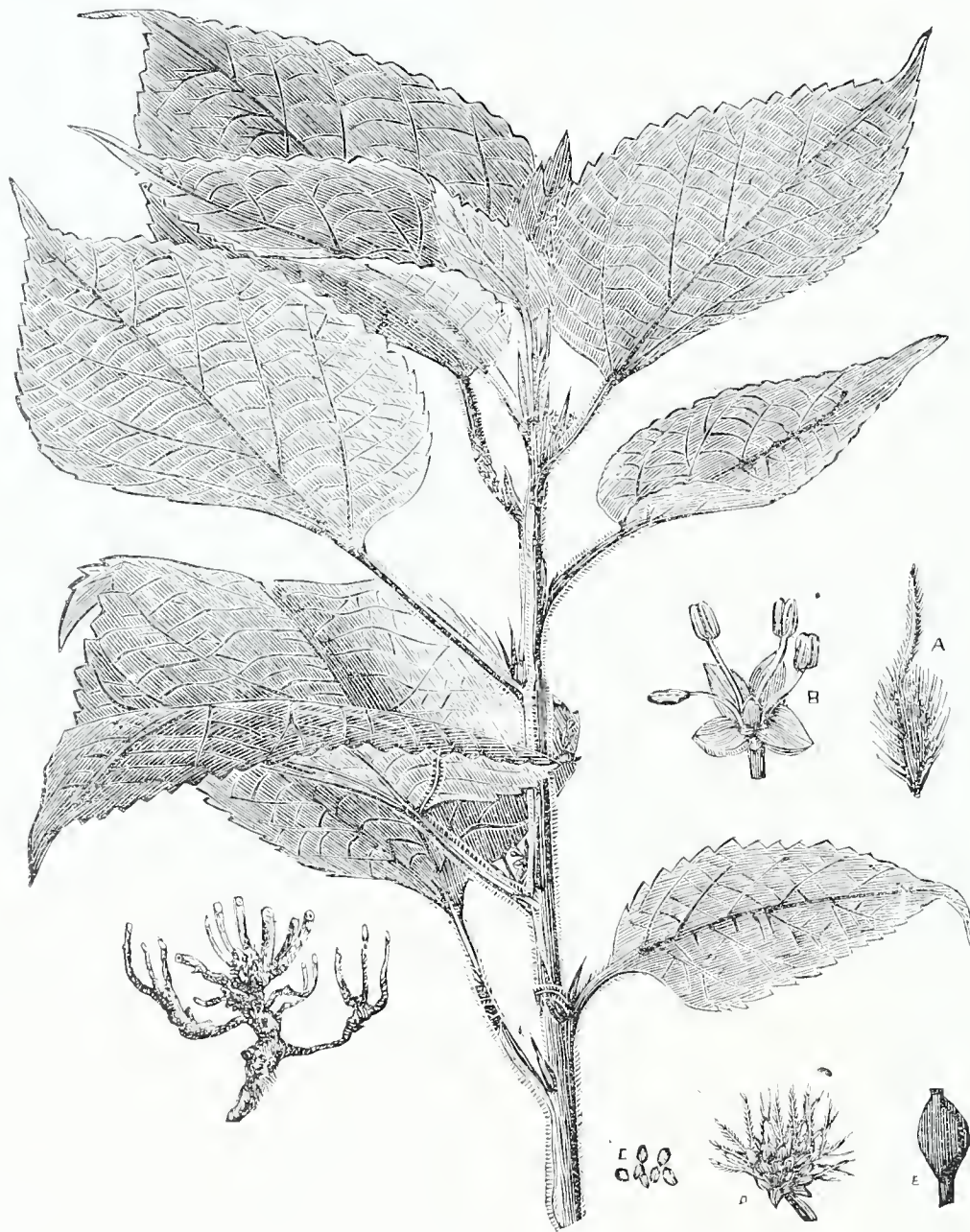
This primitive way of working, which can only be done with the cheapest of labor, has deceived most of our experimenters into the belief that the fibers were long as the stalk, like flax and hemp, when in fact they are hollow ribbons or veins, running between the leaves, of different lengths, according to growth of stalk, from two to six, or three to nine inches, and run from the bark to the wood all the way up, making it such an enormous grower. Want of knowledge of this, of course, prevented success in the making of machinery to prepare it for manufacture.

Mr. Slaughter argues, and with apparent force, that before the farmer can be induced to engage in the cultivation of ramie he must be assured of a market for his product, and to that end factories for its manufacture must be provided. Capital is timid and with reluctance finds its way into new and untried channels. For this reason governmental encouragement of a substantial nature is urged. The exact cost, feasibility and practicability of manufac-

chine type. It has a notched drum fixed on the axle that revolves when the machine is in motion. Two rows of teeth, one in front and the other in the rear of the drum, are lifted by the notches on the drum and are allowed to fall by the force of gravity. The front row of teeth represent a man with a hoe and the rear row of teeth exactly immitate the motion used with a rake. It can be used for a harrow, or a section may be removed from the center and it can be used as a cultivator for young plants.

Cruisers Not to Be Electroplated.

It is said that the United States will not permit any of the new steel cruisers to be electroplated with copper in order to render the vessels' bottoms less liable to fouling, as has been stated was their intention. The patented process spoken of was thoroughly examined by naval constructors some time ago, and condemned in an official report to the Secretary of the Navy. The report declares that instead of im-



A TOP OF STALK OF RAMIE IN FULL LEAF.

uring the product must be demonstrated before capital can be enlisted or the raw material produced.

In his efforts to interest the people of the South and Pacific coast in the growing of ramie and as well as in his endeavor to interest capital in the establishment of factories for its treatment, Mr. Slaughter has been reasonably successful. He has been offered substantial aid to start the enterprise at Alexandria, and he believes the present effort is but the beginning of the development of one of the country's greatest industries.

In the *Tradesman* of August 15, an article on the ramie plant is published, in which it is claimed that Capt. S. B. Allison, near New Orleans, has grown nearly 1,500 pounds of decorticated ribbon per acre. Mr. Allison also claims to have invented a machine that successfully decorticates ramie.

The cut published herewith represents a top of a stalk of ramie in full leaf.

New Pulverizer and Harrow.

Among the patents recently issued was one to Albert D. Powers, of Owensborough, Ky., on a Pulverizer and Harrow. All harrows heretofore invented drag or cut the ground. In the Powers harrow the principle is entirely new for a horse power implement. The pulverizer chops and digs the ground just as a man would with a hoe, with great rapidity. It is designed to be drawn by two horses, and is supported on two wheels of the mowing ma-

proving the condition of a vessel so treated the treatment would be positively destructive, as the moment the thin skin of copper was broken, as it certainly would be by contact with any obstruction, galvanic action between the copper and steel plating would ensue and the steel would be rapidly destroyed by the action of salt water.

The Buffington-Crozier Gun Carriage.

The Buffington-Crozier disappearing gun carriage for 10-inch rifles was recently tested at Sandy Hook with very satisfactory results. Ten shots were fired according to official time given out, in 14 minutes 41 9-10 seconds, to which should be added 7 minutes and 35 seconds for delay caused by the gun and not chargeable to the carriage. The projectile weighed 575 pounds and the power charge 240 pounds. The carriage is of American design, and was built at the Southwark foundry, Philadelphia, Maj. A. H. Arnold, of the engineering corps, witnessed the trial, which was conducted by Capt. Frank Heath, in charge of proving grounds.

"Tips to Inventors."

This is one of the most instructive and useful works for mechanics and inventors. Its author is Robert Grimshaw, M. E., and the book, cloth bound, retails for \$1. *THE INVENTIVE AGE* for one year and "Tips to Inventors" will be sent to any address for \$1.50.

AUTOMATIC PAPER FEEDING MACHINE.

Something About the Importance of the Novel Device to the Commercial Printing World.

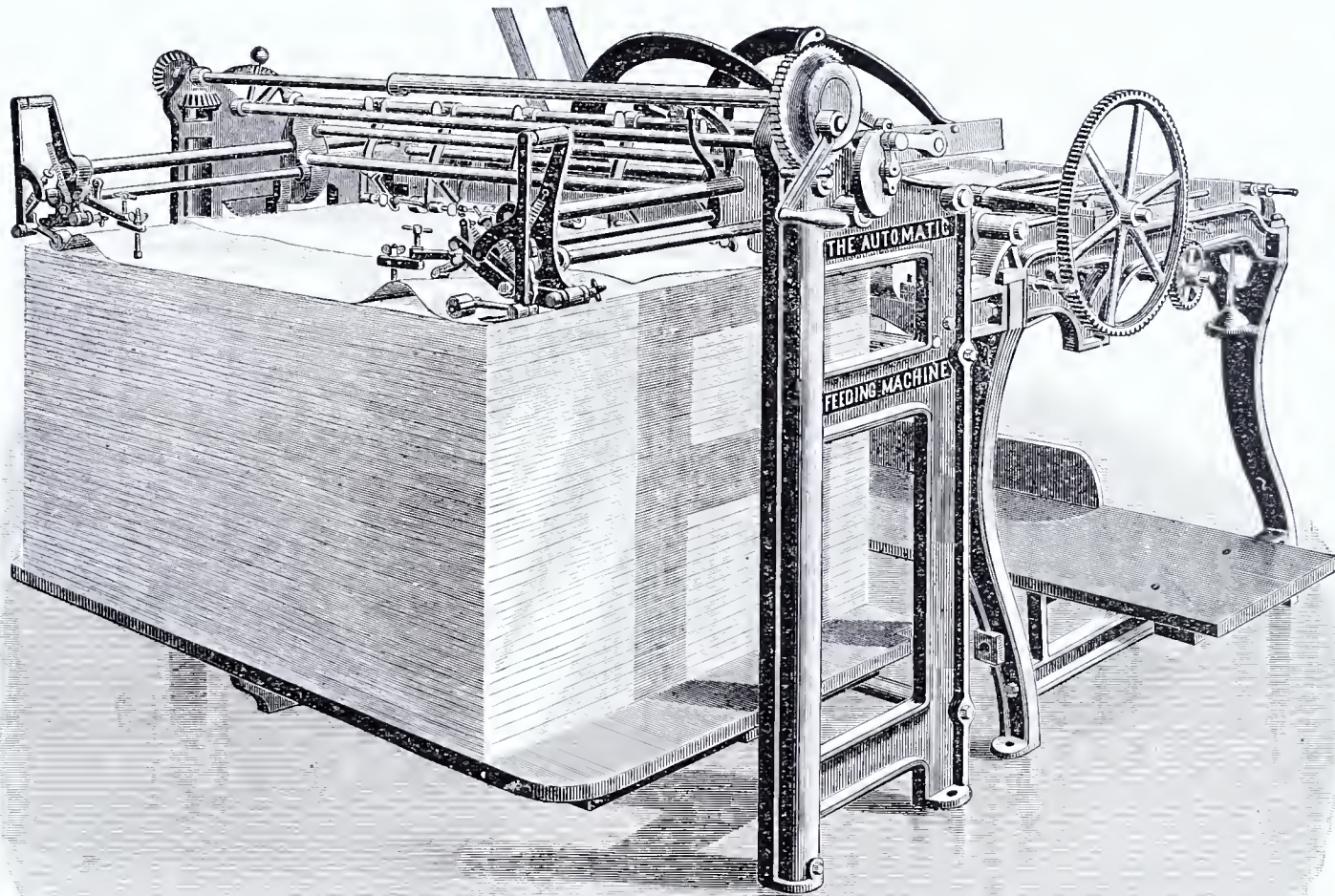
Modern equipment is the order of the day in the printing and bookbinding establishments of the country. The institution that is not abreast with the march of advancement in this line simply cannot compete. It is said of a well known book-binding institution located at the great inland city by the lake that it can afford to pay freight both ways from coast cities and yet make a larger profit than its competitors, simply because it is thoroughly equipped with modern devices and machinery for folding and binding all classes of printed matter.

The introduction of efficient linecasting typesetting machinery has materially reduced the cost of publications, but it is not alone the advance in this branch of the art that has made it possible for the public to be supplied with books and standard publications at about one-third former prices. The development of paper-making machinery and rapid printing presses have added their portion to the labor-saving methods in the art of printing. The great newspaper perfecting machine, which automatically

takes the paper from the continuous roll and produces the papers printed, folded and counted in packages of any desired number, at a speed varying from ten to fifty thousand per hour, according to the style of press used, really has made no encroachment upon fields of that class of printing appliances which are required to produce the millions of copies of printed matter that come under the head of commercial printing or that must pass through the book-binding establishment before reaching the eyes of the reader. This class of printing is done almost exclusively upon what is known as cylinder presses, and inventive genius has been bending its efforts particularly for the last half-decade, to produce presses of this type which would have a speed of operation commensurate with that already attained in other branches of printing, and especially with those machines which so rapidly and automatically fold, trim, sew or stitch and bind printed forms. It

is not an exaggeration to state that builders of this style of printing presses are now turning out machines possessed of a speed almost if not entirely beyond the power of human hands to feed the sheets of paper continuously or for any reasonable length of time to any fixed gage for register and keep pace with the demand of the press. But with the introduction and adoption of these speedy cylinder presses has come an invention which at once fits an open niche in the great printing and bookbinding establishments of the country and one which is meeting with marked favor and rapid adoption. It is the Automatic Paper Feeding Machine. This machine is applicable alike to all styles of cylinder printing presses, drop roll folding machines and ruling and calendaring machines. Some idea of the rapid recognition of the merited efficiency of this machine may be gleaned from the fact that over three hundred of them have been put into practical operation within a very short period of time. It simply feeds the sheets of paper into the printing press to any fixed gage of register and never gets tired. The paper is piled upon the feeding board as for use by the old hand method of feeding, the machine is set for operation, and it not only automatically feeds the sheets into the press and also automatically adjusts the height of the pile of paper as it is reduced, but keeps in perfect harmony with the varying conditions of speed that may be taken on by the press through uneven distribution of motive power, a feature alone that tries the patience and demands exacting vigilance on the part of press feeders—because it

receives its momentum from direct connection with the main action of the press itself. In operation it performs the functions of the hand feeder with unvarying accuracy, by reason of the novel method by which it buckles up the back corners of the top sheet and releases it from the underlying ones and quickly passes it down to the register gage. This is performed by a set of mechanical rubber rollers which, when raising the back corners of the top sheet and in passing it down to the gage, are held stationary but run loose in their bearing over the pile of paper on their return for another sheet. During the operation of passing the top sheet down to the feed register a clamp holds all the remaining paper in a firm position, while a very simple device, similar in action to the governor of an engine, automatically raises the pile of paper to the required height to secure perfect results, so that all the sheets, whether belonging to the top, middle or bottom of the pile of paper, are fed into the press from the same plane of elevation. One who has watched the movements of a press feeder will understand the operation of this machine. The hand feeder usually gives the top sheet of paper a forward movement with the feeding bone and then lifts the sheet with his hand and passes it down to the gage. He does this to break the supposed electrical connection of one sheet with another. The practice of many persons of turning the pages of a book with moistened finger tips will also explain the operation of this feeding machine. If the same method was applied to a pile of paper by moist-



AUTOMATIC PAPER FEEDING MACHINE.

ening the tips of a finger of each hand and the back corners of the top sheet were pushed toward the center of the pile and the sheet lifted up and moved away to the front the positive and unvarying action of the Automatic Feeding Machine would be well demonstrated.

In practical operation these machines are doing for this branch of the printing business what recently invented devices have done in other divisions, reducing the number of persons necessary to the work and greatly increasing the amount of product from each press. In the application of this feeding machine to folding and ruling machines, the results are even more satisfactory, showing a marked saving in cost of operation and a greater accuracy of work. When attached to a regular book cylinder press this machine makes a saving of about twenty per cent, while its application to what is styled a "pony" printing press the amount of product is even proportionately very much larger.

It was formerly known as the Burrell feeder, but has recently become the property of the Economic Machine Co., headquarters at 28 Reade street, New York. The well known firm of Messrs. Montague & Fuller, with houses both in New York and Chicago, are the agents for the company. They are of the decided opinion, from the results obtained from the three hundred and over, of these machines now in practical operation, that no live printer can afford to ignore them. They believe this feeding machine will pay for itself in wages saved and in increased product in one year. The machine is very simple both

in construction and operation. It is built upon modern methods of interchangeable parts, and with the ordinary care usually accorded printing house machinery should have extended life.

Opposed to the Deborow Bill.

LOS ANGELES, CAL., AUG. 20.

DEAR SIR:—The August number of the INVENTIVE AGE is at hand, and after reading over the many sensible and valuable articles set forth on its finely illustrated pages, I feel it due you, as publisher, to acknowledge my appreciation of it. Being an inventor, I assure you, that your write-ups of the many "Patent Sharks," are exceedingly appropriate and eminently proper. If some of the older journals, so long patronized by inventors, had been more in touch with their readers, inventors would have been saved from these smooth-monthed villians, who for a small consideration of from \$15 to \$25, are sure of finding a purchaser or capital, to push one's patent on the market at once. "Just sign the inclosed contract and remit at once," is their cry: all, of course, working exclusively for the interest and welfare of the inventor! Most of the inventors have to run the gauntlet in front of these miserable frauds. I wish to say something about that bill concerning patents, brought before Congress lately by Mr. Deborow, of

Illinois, "by request," to "declare letters patent null and void, when used, operated, or controlled by any trust, monopoly, combination or other conspiracy in restraint of trade, etc." I look upon this as an impracticable and unjust proposition. I would ask the said Congressman, if he had brains enough to get up or invent a really valuable machine, and one the advantages of which to the whole world would induce capital to develop it—whether it was a combination of capital of several persons, or of one person—would it make any difference to him, so that he was remunerated for his long labor and hard study in inventing said machine? Would he think it just to annul his patent because some company or capital, should supply the demand for his machine? Would he be encouraged to test his brains a second time? Would others be encouraged to invent anything of utility and necessity, by such a course? Would Congress command respect of the brains

of the country by listening to such imbecile petitions from its members? Does the world no longer need the use of progressive minds for the use and benefit of the human race? Must we all crystalize, ossify or carbonize?

Take away our inventors, and where would we, or the world of humanity be? Monopolies in the full sense of the term, are a curse to the country—and trusts are only monopolies intensified. This is quite admissible, when only evil to the masses is produced and where competition is shut off, and the people are robbed of something they cannot do without. But in the case of a patented article, all can manufacture and use it by paying the patentee his royalty for it—the same as we would pay for the use of land, or a house, a horse, etc. It is the result of both brain and physical exertion and he is entitled to pay just as much as is the farmer for a bushel of corn or the artist for a fine painting.

But, Mr. Editor, I yet hope that this and all succeeding Congresses will have more sense than for a moment, to entertain such an absurd, unwise and unjust proposition as here noted.

WELLS N. WHITE.

Names of All Patent Attorneys.

There has recently been compiled by Virginia W. Middleton, the well known stenographer, a list of all attorneys practicing before the United States Patent Office. This little volume is of incalculable value to inventors, attorneys and manufacturers. The cloth binding costs \$1.50 and paper cover \$1. Send to THE INVENTIVE AGE, Washington, D. C. Edition limited.

SCIENCE FOR YOUNG PEOPLE.

Conducted by E. P. LEWIS.

In one of his fascinating scientific romances Jules Verne describes a trip to the moon made by several brave and venture some individuals in a hollow projectile shot from a huge gun. Among the incidents of this thrilling voyage was the casting adrift of a small dog, which at once began to revolve as a satellite around the projectile. A trip such as this would have certain unpleasant features, such as the probability of running short on food and water, or of missing aim and wandering around the universe forever; yet, as in all Verne's romances, there is an element of possibility about the story. It is very easy to calculate—almost every college student has done it as a problem in elementary astronomy or mechanics—just how fast a body must be projected so that it will never return to the earth. It is simply a question as to which is the greater, the force of projection or the force of gravity. If a projectile is shot upward with a velocity of seven miles or more a second, it will never return to earth. If the velocity in a horizontal direction is exactly four and nine-tenths miles a second, the body will continue to revolve around the earth in a circular orbit in a period of one hour twenty-four and seven-tenths minutes. At least this would be the case if we suppose that the air offers no resistance. Actually a greater velocity would be necessary on this account, but as we know very little as to the resistance offered to bodies moving very rapidly the exact speed necessary cannot be calculated. So you see that it is quite possible to be shot to the moon, if a strong enough explosive could be made, and if any one brave enough to make the attempt could be found. Unfortunately, if the trip could be safely made there would be no way to get back.

* * *

It is a fact not generally known that the air in the neighborhood of waterfalls is strongly charged with electricity. After observing that this was the case at the foot of several waterfalls in the Alps, Philip Lenard, a German physicist, made some laboratory experiments and showed that when a jet of water falls into an insulated vessel the water becomes charged with positive and the surrounding air with negative electricity. In some cases the potential, or intensity, became so great that sparks could be drawn from the vessel. He showed that it is not the friction of the water against the air that developed the charge, because it is always produced at the foot of the fall immediately over the rocks. There has been some dispute as to the cause of this effect, and the matter is still unsettled.

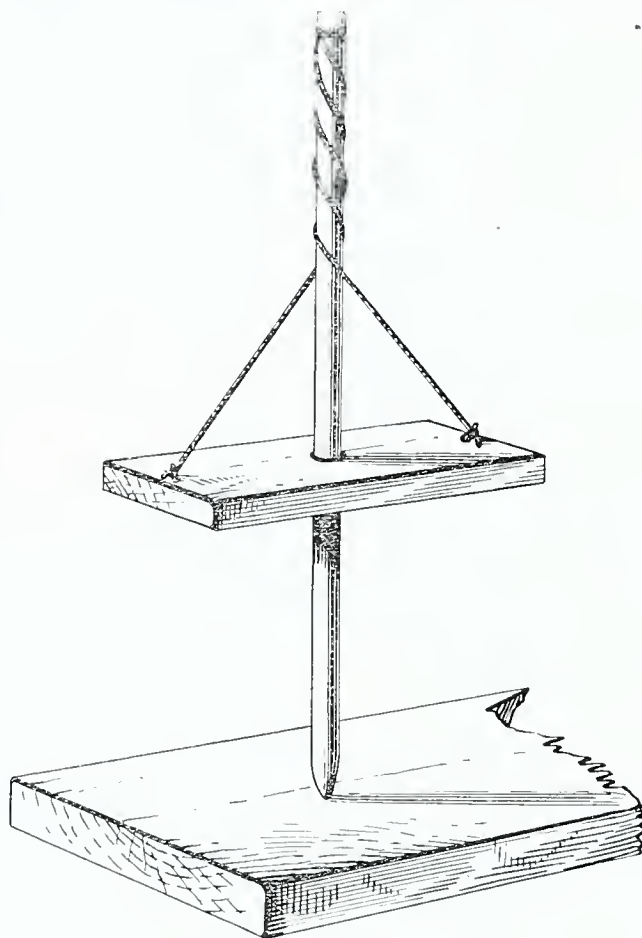
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Pure wrought iron is soft, may easily be bent, and does not retain magnetism. Steel is tough, hard to bend, and will remain permanently magnetized. This wonderful difference is all caused by mixing a very small amount of carbon with the pure metal. When the iron is first separated from its ore by roasting with coke and limestone it is called cast or pig iron, and contains four or five per cent of carbon, which makes it very hard and brittle. This pig iron is then converted into wrought iron by "puddling," that is, it is melted and air is blown through it. The oxygen in the air combines with the carbon and carries most of it off—the less remains behind, the softer the iron. Another way is to melt the cast iron with iron ores containing oxygen, the oxides of iron, these having the same effect. To make steel from the wrought iron, some carbon must be put back, but not so much as there was in the pig iron. There is generally about one to two per cent of carbon in steel. It is made in several ways. One is to pack powdered charcoal around the iron and heat it until enough carbon has been absorbed. This is called cementation. The principal method now used is the Bessemer process. The cast iron is melted in a vessel called a converter, and the carbon is removed by an air blast through it. Then enough cast iron is added to give it just the right amount of carbon.

* * *

One of the simplest evidences that heat is due to motion—to the vibrations of the molecules of matter—is that we can produce any amount of heat by mere mechanical motion, such as friction. Of course if heat were a substance it would be impossible to get an endless amount of it out of any one body by simply rubbing it. It is very fortunate for nations in which the use of matches is unknown that heat can be produced by mechanical means, for this is the only way they have to light their fires. It has not been so very long since even civilized nations used a flint and steel for that purpose. Some South Sea and East Indian nations make fires by rubbing a

small stick of bamboo in a notch in a larger piece of the same wood, or by sawing one piece across another, until the dust rubbed off catches fire. The Eskimos use a similar method, but twirl the piece of wood between the palms of their hands like a drill, or they rotate it by winding a cord once around it and pulling the cord back and forth like a bow drill. Some savage tribes use a more ingenious device like what is called a pump drill. The accompanying diagram shows how this works. A strip of wood several inches long has a round hole in the middle, through which passes a round pointed stick. Two cords run from the top of the stick to the ends of the strip of wood. On coiling these cords around the stick until the strip is raised to its top, putting



the point against a board, and pressing the strip down suddenly, the stick will be caused to rotate rapidly, and by a little practice it may be made to turn around so much as to wind the cords around it in the opposite direction. If this is kept up long enough the board may be set on fire. By this method it is quite easy to light a fire, but the clumsier ways mentioned require a good deal of patience, and sometimes do not succeed at all. After finding out how much work they require we can appreciate the blessing of matches. We will be still more thankful when matches are no longer necessary, and all that we have to do for light and fire is to press an electric button.

Machine for Sprinkling Paris Green.

Mr. D. M. Pinckney, of South Onondago, N. Y., has invented a Paris Green Sprinkler which promises to meet with favor among potato growers everywhere. A cart is constructed with an extension axle which can be lengthened or shortened to accommodate the various width in rows.

The hose and sprinklers are arranged and controlled by levers in such a manner as to be instantly adjusted to the different width or irregular rows at the will of the operator. It is claimed that it will work on the hill side going lengthwise of the hill with the same perfection as upon the level.

Compliments for "Inventive Age."

THE INVENTIVE AGE of Washington, D. C. is a large 20 page monthly illustrated journal of manufacturing industry and scientific progress, nicely printed on heavy paper, 10 cents a copy or \$1.00 a year. The first page of the August number is devoted to an illustration and sketch of the new cruiser Minneapolis, followed with illustrations on scientific irrigation and other matters of interest. This paper ranks among the leading publications of the country. It illustrates and describes new inventions, which is one of its leading features. It gives a choice of two premiums to its subscribers, which alone are worth the price of subscription—World's Fair Views, four books each containing 55 photographs—the Atlas of the world, 123 large pages of maps; illustrations and valuable information.—*North Harvey Herald.*

THE INVENTIVE AGE, a journal devoted to manufacturing industry and scientific progress, ranks high among the leading publications of its class. Besides illustrating and describing new inventions, it presents each month a page of familiar science for young people, written without technicalities so that all can understand. This is a notable feature and will be appreciated by a large constituency.—*Home and Mart.*

Names of Patent Solicitors.

Names and addresses of attorneys practicing before the United States Patent Office, carefully compiled by Virginia W. Middleton, for sale by the INVENTIVE AGE; cloth \$1.50; paper \$1 Edition limited.

Books and Magazines.

In no way is the wonderful development of electricity more strikingly illustrated than in the remarkable increase in the publication of electrical books and magazines. So numerous have electrical terms become and so necessary their use in the every day affairs of the business and scientific world that an encyclopedic dictionary has become an indispensable adjunct to the library and work shop of the practical engineer and electrician as well as to the amateur. The "Standard Electrical Dictionary" is the name of a work of this nature, by Prof. T. O. Sloane, which gives evidence of much study and thoroughness. It is a book of 624 pages, with 350 illustrations, and its definitions of electrical terms are so clear and concise that the work becomes of value to the non-professional as well as professional student. In the discussion of electrical matters in the scientific, and even in the daily and weekly press the large number of electrical terms used are absolutely unintelligible to the average reader and as the terms used have "come to stay" and increase as advancement is made in electrical science it is important that their true meaning be understood. This work fills the field. We are just entering on electrical age and to know just what is meant by ohms, amperes, volts, gram, mil, and like terms is necessary to a complete understanding of even the fundamental principles of electrical science. It is published by Norman W. Henley & Co., 132 Nassau street, New York. Price \$3. For sale by INVENTIVE AGE, Washington, D. C.

* * *

Mr. J. P. Barrett, city electrician of Chicago, and the Electrical Commissioner of the World's Fair, announces as ready for publication his book entitled "Electricity at the World's Columbian Exposition." In the preparation of this beautiful and interesting volume, Mr. Barrett has had the invaluable assistance of Dr. Hornsby, through whose hands all the matter has passed. The book is not only full of data—historical, technical, etc.—but is richly embellished with hundreds of choice engravings. It is also handsomely bound in decorative cloth covers. The price of the volume is only \$2.50, and it could not be sold for that sum had not many of the exhibitors in Electricity building guaranteed in a measure the cost of its production. It is likely soon to run out of print. All orders should be addressed direct to J. P. Barrett, City Hall, Chicago.

* * *

In an article entitled "The Auxiliary Machinery of an Ocean Greyhound," in the September number of Cassier's Magazine, Mr. H. L. Ebsen draws an interesting picture of the maze of machinery, besides the main engines and boilers, which helps to make up the equipment of one of the modern transatlantic liners. To the traveler abroad who rarely, if ever, ventures into the working depths of his temporary floating home, the article ought to be perhaps specially interesting, telling of many things which are little dreamed of and yet worth knowing.

* * *

Judge Walter Clark, the Associate Justice of the Supreme Court of North Carolina, writes in the September Arena on "The Election of Senators and the President by Popular Vote, and the Veto." Judge Clark is in favor of the election of Senators by popular vote, but is opposed to the extension of the principle to Presidential elections, as he believes it would imperil the republic. But he considers the powers of patronage and the veto vested in the President anomalous and dangerous, and would have them curtailed.

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The August issue of the Street Railway and Electrical News, Minneapolis, was given up to a verbatim report of the recent midsummer convention of the Northwestern Electrical Association, held in that city. The number contains numerous illustrations and cuts of the more prominent members of the association.

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The paper on "Male and Female Attire in Various Nations and Ages," by Mrs. Ellen Battelle Dietrick in the August Arena, doubtless received a wide reading. It is an historical examination of the fascinating subject of costume, which meets the arguments of those opposed to modern dress reform movements on the grounds of custom and historical precedent by showing that women were the original inventors and wearers of trousers, and that their early use by men was deprecated as effeminate. Strabo, a Greek historian, about 450 B. C., remarks this peculiar feminine costume which the Persians adopted after conquering the Medes from the vanquished. The Greeks and Romans, Thracians, Cilicians, etc., then all wore skirts, men and women alike.

Countries Where Piracy of Inventions is Legalized.

BY GEORGE G. TURRI, Melbourne.

A thousand writers have harped upon the wondrous nature of the inventive faculty. They realize that man is a creator, and that capital and labor alike are, and will always be, impotent without machinery and processes—that is, invention. What Bacon has said is echoed by them all, "The introduction of new inventions seemeth to be the very chiefest of human actions. The benefits of new inventions may extend to all mankind—they make all men happy without injury to any."

A few remarks from me may not be amiss, dealing with some of those features of the Patent Laws which control the use of new inventions, influence the development of inventive genius, and markedly affect human happiness and progress.

Clearly put, popularly available comparisons of the chief patent laws of the world are seldom, if ever, seen; but scrappy newspaper references to the subject are numerous. Frequently the latter make some side issue prominent, and by failing to give weight to fundamental principles, have the effect of misleading the reader. Thus we have this anomaly that all admit that industrial progress goes hand in hand with a good patent law, and the latter subject is one few understand.

In Australia vigorous efforts are made to stimulate local industries, but where are the skilled attempts to improve the patent law?

A good patent system is essential if inventors are to be given an incentive to the hard, persistent labor which is required to evolve industrial improvements. In countries where patents are issued, but where inventions and industries languish, we are driven to the conclusion that the patent laws must be bad.

"If men," says the Hon. Charles Mitchell, of Washington, who is one of the highest of authorities, "were not induced by the rewards of a patent system to cling to their ideas through all vicissitudes, their hands would drop in discouragement." At the same time to some extent Mr. Mitchell is wrong. When Shakespeare wrote of "the brightest heaven of invention" nothing worthy the name of patent law existed, and yet his phrase indicated the happy results possible without it.

Let me now point out what patents are, and who are entitled to these temporary monopolies. Just as a tyrant or autocrat may be a good ruler, so a monopoly may sometimes be publicly beneficial. If once the public adopts the patent the inventor has a power of taxing every consumer. It is for his and their benefit jointly. This power has enabled some patentees to amass millions and for a time keep up prices. Anyone knows cases where the cost of material and labor on patent articles are vastly lower than the selling price. For example, an article I patented for an inventor last week costs 18s to make locally, yet he sells it for £3, and his very first order was for a sufficient number to enable him to pay the charge for obtaining his patent and have a large balance of profit.

But in most cases patentees do not make large fortunes; even if successful, the profit made is immensely less than the benefit they confer on the public by their genius.

In the United States, no one but the actual inventor or his assignee is granted a patent. All invention of any value sooner or later become known and used in that country, but monopolies are not allowed except to actual inventors or their assigns.

In England it is otherwise. Supposing Mr. Wolseley when he invented his famous sheepshear could not afford to apply, or through illness postponed applying, for an English patent. The English law is that any man could secure the patent for himself by obtaining a copy of Wolseley's specification and drawing (available for a few shillings at an Australian Patent Office) and sending the same to England with suitable instructions before any other copy got there. Had someone else done this Wolseley would not have been able to get a valid English patent, nor even have had the right to make his machines there to send to Australia. This power to secure patents for other people's inventions has been used repeatedly. The piratical patentee is officially classed as a benefactor to England.

In 1891 Sir Richard Webster, Q. C., the Attorney-General, gave this matter anxious thought. He declared the law to be that "an importer was the true and first inventor." It mattered not whether he has "stolen the invention or learned it from some third person, he was regarded as meritorious in the sense of being the true and first inventor, that the true and first inventor, if resident in England, was regarded as meritorious." This decision was given in favor of a Melbourne client of my own who (whether

truthfully or not) posed as the inventor. By the same mail steamer that took his application, several gentlemen who declared my client had stolen the invention from them also travelled to England at great expense expressly to patent the same thing. They were three days later than my client in filing their application, and the result of a long and expensive legal battle was the decision that even if they had been defrauded, there was no remedy.

At the World's Congress on Patents at Chicago, Mr. W. Lloyd Wise, J. P., a patent agent of high character, made public his opinion that it is proper to give the patent to the first introducer or importer of the invention, whether he is the inventor or not. Some assert that it is good for the country to have knowledge brought into it of inventions. Therefore, whoever introduces that knowledge first should be rewarded, even if he steals it from the inventor himself. I doubt it. I deny it. That law sinks England to the level of a buyer of stolen property. If another nation be plundered, she will pay whoever brings the spoil to her. The difference of a few days or months does not warrant her in thrusting aside the real inventor. The real first inventor might be some English citizen who after years of toil makes his application a day or two after a foreigner of anti-English interests, and because that Englishman is a day late he is ruined. The British system does not make fair allowance for the miracles of thought, of labor, of patience, of genius and of abnegation inventors perform. In degraded Africa he who steals the cattle of some other tribe is feasted as a public benefactor. But what Briton would uphold that?

Before patent law, patents were issued in England by royal favor. The privilege was abused—court favorites and others were allowed in the most reckless way to disturb trade by monopolizing the sales of every day articles—not new invention—such as iron, coal and salt. The Royal object in issuing these oppressive monopolies was often sordid. These patents so incensed Parliament that it interfered in 1623 with a Statute declaring that no monopoly thereafter could be granted by the king, except to the inventors of new manufactures.

England was not a manufacturing country then; education was in a shockingly backward state; news spread slowly; books and newspapers hardly existed; they were dear and inaccessible to the masses; incredible numbers could not read. Parliament, to stimulate trade, decided to allow this kind of monopoly to exist. When an English traveller returned from a distant land, bearing the knowledge of some important invention, and intending to set up a manufactory in England, we can well understand his being favored. Enterprise was rare, and the favor was not much after all, for the expense of patents in fees was enormous.

In the year 1650 men's wits were dull; no patents were issued. In 1700, two only; in 1750, seven; in 1800, about 100; 1850, about 600. Up to the new law of 1883 the number increased very slowly. In the first 150 years of the patent law not much over 1000 patents issued.

It was in 1691 that the court held that it was the same thing whether a man claimed by virtue of brain power or by what he had learned in his travels, he was equally "the true and first inventor." But it should be very different in the present day when a copy of every patent is issued in America and some other countries is, as matter of routine, sent to England by post free of cost, and becomes accessible to all British citizens. Except for a few per cent of these on which patents are secured by the inventors or by "introducers," all these inventions can be used by manufacturers, for no monopoly exists.

One English judge has ventured to doubt whether the natural common sense definition of first inventor cannot be adopted in English law. (Kurtz v. Spence.)

Fortunately for Australia, the legal authorities in various colonies have adopted the common sense interpretation. Let us now enquire whether it does good to the country to give the introducer a patent? Conditions have so changed in the last 100 years that what was a benefit may be one no longer. Supposing these patents prevent widespread manufacturing? They are not now a means for securing valuable knowledge otherwise unobtainable. Whether the introducer applies or not, England gets the knowledge; hence the consideration the introducer offers is a sham. It would not be so if every introducer agreed to manufacture the invention in England, but no such condition exists.

The English law on this point prevails in New South Wales according to the official practice, but the latter, I believe, is due to an erroneous and hitherto unchallenged interpretation (by a Crown law officer). The act does not name "the true and first inventor," but "authors or designers" as entitled to patents.

In Queensland and Western Australia the practice is to treat the English interpretation of the words "true and first inventor" as incorrect, whilst in Tasmania and South Australia the English system is (perhaps not willingly) treated as prevailing; the words "the true and first inventor" are used in the Acts of all the four colonies last named. As to what these words mean I believe the court has never in

any of these five colonies been referred to for decision. In Victoria and New Zealand the American interpretation is happily and unmistakably the law. The Acts state that no "unauthorized importer" may apply. The following is a complete list (omitting countries of under a million population, except Australasia) showing how the world is divided on this point. In countries where piracy is not legalized, if the foreign inventor wants no patent, these countries soon enough get the knowledge of the invention without any "introducer's" aid, and instead of one man only having the right to profit by these inventions, everyone is free to do so.

Piracy is legalized in Great Britain, Cape Colony, Ceylon, South Australia, Tasmania, Russia, Spain, Turkey, Denmark, Columbia, Ecuador, Bolivia. No British land except South Australia, but all the others in this list require the invention to be actually worked in the country, otherwise the patent becomes void.

In the colonies the laws give patents to the "true and first inventor," which words have been perverted from the natural meaning the Parliaments probably intended them to have to the meaning prevalent in England. This perversion is usually due to the Crown officials, but the court may yet decide that these words do not legalize piracy.

Piracy is not legalized in Canada, New South Wales, Victoria, Western Australia, India, Fiji, Queensland, United States, Austria, Belgium, Portugal, Germany, France, Switzerland, Norway, Sweden, Italy, Finland, Brazil, Chili, Argentine, Uruguay, Liberia, Venezuela, Guatemala and Mexico.

In some of the above British countries the patent is to "the true and first inventor," but the authorities will not recognize the British interpretation of these words.

In these and other countries others than the inventors may become patentees, but their title is unsafe unless they hold the actual inventor's authority.

There are some countries that allow a patent to anyone holding a patent elsewhere for the same invention, but the condition that the invention must be worked locally is in force also.

Technical Training.

In the formative period of a science great progress may often be made without much training, by close observation, aided by judgement and imagination, but after it has reached a higher stage of development technical education becomes more and more essential. Not only is it necessary for the discoverer or inventor to know what has already been done but the simpler applications having been first developed, there remain only those that are more complex, and which for this reason demand not only vastly more thought, but also in most cases require the assistance of collateral branches of knowledge, which must also be studied. As an instance, those metals which either exist in the native state or may be easily separated from their ores, such as gold, silver, iron, copper and lead, were known to the ancients. Others, which are not so plentiful, but not difficult to separate, such as bismuth and antimony, were discovered later. To make further advances the methods of chemical separation were necessary, and no progress could be made without the development of that science. Later still the discovery of the electric current and its electrolytic power gave us sodium, potassium, aluminium and other substances, which without the advance of electrical knowledge would probably have remained undiscovered. Finally the still more recent art of spectrum analysis has enabled us to find several new and valuable metals. Many instances such as this might be brought forward to show the interdependence of arts and sciences, and to emphasize the value of a broad scientific training, as the basis of every technical profession. Edison, while not a graduate of any scientific school or college, has evidently been impressed with this idea. He is said to have one of the finest general scientific libraries in the country, and from the number and variety of his inventions we may safely infer that his mind has always been ready to receive hints from any source. The great value of a broad education does not, as some seem to think, consist in the accumulation of facts that must be soon forgotten; the benefit comes from practice in proper methods of thought and acquiring familiarity with the sources of knowledge. Some men like Edison have native force sufficient to enable them to do this for themselves, but there are few that can do this. For some time there has been a discussion among educators and practical engineers on the subject of technical training, and the almost unanimous opinion seems to be that it is better not to attempt too much practical work in the schools. Most of this can be learned far better and more economically in practical life, and it is better for the student to lay as thorough a foundation of theoretical knowledge as possible, taking only enough shop work to train his eyes, hands and judgment. Such students, if they have a fair amount of common sense, will always know what things are possible and what impossible. It is a significant fact that few of the perpetual motion and other "something out of nothing" cranks are graduates of colleges and scientific schools. E. P. LEWIS.

PATENT DECISIONS.

BURR *vs.* FORD & FERGUSON.

This case was an interference in the Patent Office between the patent of Ford & Ferguson and the application of Burr, the invention being a hoop coupling. The case came before the Commissioner of Patents on appeal from the decision of the Examiners in Chief of the Patent Office, who awarded priority of invention to Ford & Ferguson, Burr being, of course, the appellant. Burr claimed a date of conception much earlier than that established by his opponents, but his testimony was not of sufficient strength to invalidate the already issued patent of Ford & Ferguson, so that the decision of the Examiners in Chief was affirmed, and priority awarded to the patentees.

SOLEY *vs.* HEBBARD.

The case of Soley *vs.* Hebbard was an interference proceeding in the Patent Office, and involved the question as to who, of two claimants, was the first inventor of a certain target making machine. The Examiners in Chief decided that Soley was the inventor of a portion of the machine, giving Hebbard credit for the remainder. From this decision Hebbard appealed to the Commissioner. After exhaustively considering the testimony and the facts of the case, the decision of the Examiners in Chief was reversed and Hebbard was adjudged to be the first inventor of the entire machine.

HIEN *vs.* PUNGS.

Hien *vs.* Pungs was also a case involving the question of priority of invention of a brakebeam. It was an interference case in the Patent Office and was adjudicated by the Commissioner of Patents, who considered it on appeal from the Examiners in Chief. That tribunal, the Examiners in Chief, awarded priority to Pungs, who had been granted a patent upon the invention and who had established dates of reduction to practice earlier than those of Hien. This decision the Commissioner affirmed. Hien attempted to use in the proof of reduction to practice a prior and abandoned application made by him, but the Commissioner ruled, that this abandoned application could not be used for such a purpose.

SCHNABEL *vs.* SHELLABERGER.

This case was a Patent Office interference, and the subject matter involved was a form of wire band for fences. The case was decided by the Commissioner of Patents; and he held, affirming the Examiners in Chief, that Shellabarger was the prior inventor and therefore entitled to the patent. In this case it seemed that Schnabel was the originator of one form of the band and Shellabarger the originator of a second form; and the question arose whether separate patents should be issued or a single patent covering each be issued to one inventor. It was decided, however, that the two forms, being of no patentable difference, should be the subject of but a single patent, and that this should be granted to Shellabarger, since he invented the form credited to him before the conception, by his opponent, of the remaining form.

PARMLY *vs.* HOCHHAUSEN.

Parmly *vs.* Hochhausen was also a Patent Office interference, and had for its subject an arc light, which is said to be of vast commercial value and therefore the cause of a vigorous and protracted contest. The case was decided in favor of Parmly by the Commissioner of Patents, to whom it came on appeal from the Examiners in Chief. It was held by the Commissioner, affirming the Examiners in Chief, that the record showed that Parmly reduced the invention to practice before conceived by Hochhausen.

MERRITT *vs.* MIDDLETON *et al.*

This was a suit at law by Samuel F. Merritt against John D. Middleton and Reuben S. Middleton for alleged infringement of U. S. Letters Patent No. 175,821 for improvements in eye-glass holders issued April 11, 1876 to I. Neal Clawson, and assigned to complainant. The Circuit Court dismissed the bill and the complainant appealed to U. S. Circuit Court of Appeals, Second District. The patentee's device was made of a single piece of wire and bent to form two parts, a safety pin for attaching to the users clothes, and an upwardly projecting hook for receiving the eye glass. The answer of the defendant was that the device was devoid of patentable novelty in view of the domestic patent to Merritt No. 58,867 and the English patent to Mont-hart and Tent, No. 1788 of 1863. These patents were for similar devices and the court held, affirming the court below, that the defendant's contention was a good one and that the patent in suit was void.

The decree of the court below was, therefore, affirmed with costs.

H. L. JUDD & CO., *vs.* FOWLER *et al.*

This case came before the U. S. Circuit Court of Appeals, Second District on appeal from the Circuit Court of U. S. for the Southern District of N. Y.; and was a suit by Henry A. Fowler, John H. Lingley and Samuel Fowler against H. L. Judd & Co., a corporation, for infringement of patent No. 466,940, dated January 12, '92 and granted to the Fowlers. The defendants contended that the invention had no novelty; that it was invented by one John H. Bennett; and that they, the defendants, did not infringe. It was held, however, by the court appealed to and by the court below, that this contention was bad and that the patent was not only valid, but that it was entitled to a construction broad enough to include every variation of the invention. The decree of the Circuit Court was, therefore, affirmed and costs imposed upon the defendants.

CORNELL *vs.* BATAILLE.

This was a suit begun in the Circuit Court of the U. S. for the Southern District of N. Y., and appealed therefrom to the U. S. Circuit Court of Appeals, Second District. It was brought by John M. Cornell against Achille Bataille, for the infringement of the first claim of Letters Patents No. 213,119 issued March 11, '79 to Maddox Humphries, for improvements in folding gates; and the bill was dismissed by the court of original jurisdiction. The Court of Appeals held, following the first decision, that the patent was not, in view of the state of the art, entitled to that construction which would place the defendant's device within its scope, and therefore, that there was no infringement, which decision was an affirmation of the decision of the court below. The subject matter of the patent in suit was a gate for use in hallways and similar places; and it was shown in evidence that the principle, that of a laterally contracting or folding gate, was old and well known, which made it necessary to construe the patent so narrowly.

ELECTRIC RAILWAY CO., OF THE U. S., *vs.* JAMICA AND BROOKLYN RAILROAD CO.

This case involved a bill in equity for the infringement of Letters Patent No. 407,188 issued July 16, 1889 to Stephen D. Field, for an electric railway, and was originally entertained by the U. S. Circuit Court, Eastern District of N. Y. The suit involved a patent which was commercially of great value, and which was granted to Field only after a protracted interference in the Patent Office. The defendants contended that the patent was not infringed; that the invention was anticipated by prior patents, printed publications and prior inventions, that the specification of the patent was insufficient, that the invention lacked novelty; and that it was abandoned by its inventor. After exhaustively considering the voluminous testimony and a thorough review of the law the court declared claim 1 of the patent in suit to be invalid and dismissed the bill of complaint. The decision was of vast importance for reasons both technical and pecuniary. It involved large sums of money, and the patent was being watched by persons interested in electric railroads because of the value of its subject matter. Whether the decision will be appealed from cannot be now determined, but it is probable that every resource will be exhausted by the complainants in their efforts to uphold the patent and attain a favorable decision.

FULLER & JOHNSON MANUFACTURING CO., *et al.* *vs.* STEVENS *et al.*

This is an equity action for the infringement of three patents Nos. 423,733, 423,734 and 486,200, all owned and controlled by the plaintiffs. The case came before the U. S. Circuit Court, Northern District of New York, as a court of original jurisdiction and that court after examining the patents in view of the state of the art declared claims 5 to 8 inclusive of No. 486,200, to be valid, and claims 3, 4 and 6 of No. 423,724, and claim 5, of No. 423,723 to be valid. The remaining claims of the several patents were not involved and were not, therefore, adjudicated. This being the decision of the court and it being conceded that the claims were infringed, a decree for an injunction and accounting was issued on the claims in question, but without costs.

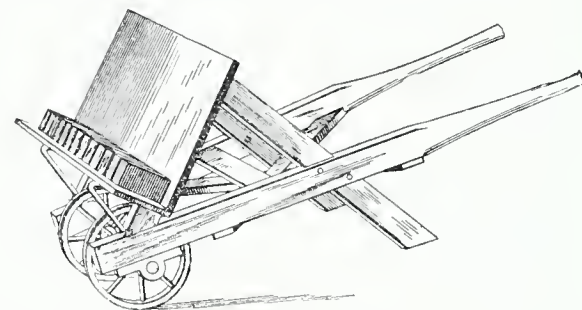
IN RE EX PARTE GRAYSON & CRECELIUS.

This case was an ex parte application in the Patent Office and was filed April 26, 1893. It involved quite an interesting and exceedingly valuable subject, namely, a bicycle frame constructed of an integral casting of aluminum alloy; and if such a device could be made the subject of a patent monopoly vast profits would be netted to the inventor. Primarily the case was favorably acted on and passed to allowance, when, coming under the Commissioner's observation, it was withdrawn from issue and

the applicants were served with an "order to show cause," or were required to appear before the Commissioner and show reason why the patent should be issued. They appeared by their attorney and the case was exhaustively and ably presented, but the Commissioner held, that, aside from the question of novelty, about which there was some doubt, the invention was not patentable since it involved merely the substitution of one material for another, which would not lend patentability to any device. The case was therefore rejected, leaving the applicants' only remedy to be an appeal to the Supreme Court of the District of Columbia. Whether this will be taken now cannot be definitely determined.

Warner and Hammond's Brick Truck.

Brickmakers will be interested in the novel truck shown in the accompanying illustration. By the use of this truck the brick may be wheeled directly from the machine to the drying kiln without other handling, thereby preventing checking, chipping and the usual injuries incident to manipulating them by hand in the old way. The truck consists of a triangular frame provided with an inclined table and a pair of supporting arms adapted to receive the pallet upon which the bricks are deposited as they come from the machine. The table and supporting arms are placed at right angles to each other so that when the truck is tipped forward the



arms will assume a horizontal position and can be moved beneath the pallet. As the arms are lowered they will lift the pallet from its support and the bricks will lean back against the table so that they can be wheeled without injury to the horizontal beams placed at the right height for the reception of the table and its load in the drying kiln. It will be observed that a space is left between the lower edge of the table and the tops of the arms for the reception of the edge of the tablet in order to bring the surface of the table against the ends of the brick, so that when the handles of the truck are lowered the brick will not slip back endwise and become jarred and injured. In addition to the safety with which the brick can be transported the operation of handling the brick is greatly facilitated and much time and labor saved. This invention is the result of the ingenuity of Messrs. Dwight M. Warner and Charles E. Hammond, brick manufacturers, residing at Sparta, Mich., where the invention has been and is now in practical operation.

THE INVENTIVE AGE has received from Reichelt & Oltch, "International Patent and Technical Bureau," South Bend, Ind., a letter stating that they have foreign agents and carry on business as advertised and in proof thereof send copies of their letter headings and a couple of letters of endorsement from parties who have done business with them.

The Adamson Company, Muncie, Ind., also claim to do all they represent and say they are as anxious as anyone to have exposed all "Real Estate & Exchange Bureaus," soliciting Foreign Patents, "Gold Medals," "Patent Bulletins," etc. We have asked these firms to assist us in that line, and as to experiences with [and opinions of, these and other firms THE INVENTIVE AGE has called upon its readers—the inventors of the country—to testify. The method of selling patents, not the procuring of them, is the question at issue. What has been your experience?

The New York Bridge.

The commission appointed by the president to investigate and recommend what length of span, not less than 2,000 feet, would be safe and practicable for a railroad bridge to be constructed over the Hudson River, between New York and Jersey City, finds that a 2,000 foot span cantilever bridge, with a pier in the center of the river, would be safe and practicable, and that its cost, including viaduct, would be \$26,723,000. The cost of the center pier is estimated at \$9,710,000. The depth of rock foundation within the limits of the bridge location is 260 feet nearly 100 feet deeper than any existing foundation. A 3,100 foot clear span cantilever from shore to shore is found to be possible, but impracticable, on account of its expense—\$51,128,000. The board reports that investigation satisfies it that a six-track, 3,100 foot, single-span suspension bridge would be safe and practicable, and would, if certain constructions were adopted, cost \$35,367,671. Such a bridge would carry six maximum freight trains moving side by side at full speed.

Patent Agencies.

As stated in previous issues THE INVENTIVE AGE has instituted an investigation into the manner of doing business and the legitimacy of the numerous so-called Patent Agents and Patent Brokers who advertise their respective superior advantages for the sale of patents and the organization of companies for the manufacture of patented articles. The July issue contained a chapter on this subject, detailing at length the questionable methods pursued by a couple of Patent Brokers—Smith of Chaffee, and Gregory of Marilla, N. Y.—which had aroused the suspicions of the U. S. Postoffice authorities and resulted in an action against them for using the U. S. mails for fraudulent purposes.

In connection with these institutions, under the caption of "About Patent Sharks" we took occasion to allude to what seemed to us to be the extravagant claims made by other concerns organized for the purpose of obtaining and selling patents.

Upon such eminent authority as that of Dr. Gatling, president of the American Association of Inventors and Manufacturers, and upon an investigation of the efforts put forth to dispose of patents we are convinced that the appellation of "Patent Sharks," upon the information to hand, should have been confined to those individuals only against whom the government had instituted proceedings. So far as investigations have been conducted it is evident that the efforts to dispose of patents by the "Association American Inventors, Philadelphia, Geo. H. Holgate, Manager," are thorough, legitimate and in accord with good business sagacity. Dr. Gatling writes as follows:

"Being very busy in attending to my gun business and not having the time to attend to the sale of a patent granted me for improvement in bicycles, I did, some months ago, place the sale of said patent in the hands of the above mentioned Association. But before I did so I took occasion to find out their standing for honesty and fair dealing, etc. I first looked in Bradstreet's Commercial Record and found that the said Association American Inventors were rated as of good commercial standing. I then wrote a friend of mine in Philadelphia (and who is an experienced business man) requesting that he make inquiries as to the standing of the Association. He did so and wrote me that they were all right and considered to be honorable men. Such being the case I placed my bicycle patent in their hands for sale. They claimed, or demanded, from me no money consideration for their services, but agreed in the event they sold the patent they should have ten per cent commission out of the proceeds of the sale, which I considered reasonable. From the dealings and information I have I do not think they should be classed as "Patent Sharks."

Dr. Gatling is a man in whose judgment THE INVENTIVE AGE has great faith and as we do not desire intentionally to injure or misrepresent the Association American Inventors, or any one, in justice to all concerned the above facts are set forth.

The Worm and Science.

The Senate bill to establish experimental stations for silk culture, revives again that important question—the possibility of growing and reeling silk in this country in competition with the foreign producer.

In the various branches of human industry, the machine has in nearly every instance demonstrated its ability to "knock out" the antiquated efforts of hand labor. But there are certain kinds of labor against which the machine drives the force of its scientific impetus in vain. And this is no better illustrated than in the fact, that with the most improved machinery for silk reeling, with wages of operatives at about \$1.25 per day, and home-grown material, this country could not compete with the manufacturers of Europe or China. Thousands of dollars were spent in arriving at this conclusion, and the only excuse given was that raw silk should not be upon the free list.

In Europe the silk reeler works for less than fifty cents a day, pays rent and lives (?) In China wages are at a minimum; but everything edible is utilized and, the apparatus with which silk is reeled, is of the most primitive character. A Chinese woman sits at a small furnace, about two feet square, upon which is a pan containing the cocoons which are boiled until their filaments are loosened by the hot water. She then deftly catches the ends of four or five of the sticky filaments, twists them together and passes the thread thus formed through a glass or metal eye in the reeling machine. This machine is of wood, with a small reel turned by a pulley geared to a twelve inch wheel by a cord. Two short, upright sticks in an inclined board hold a transverse rod bent at one end to form the eye for the thread, which is wound on the reel and becomes the raw material of commerce while the Chinese stirs the cocoon with one hand and turns the crank with the other.

The infinite patience and care of these Mongolians in silk reeling is in huge contrast to the hurry of western operatives and the ceaseless whirl of per-

fected machinery. And this is better understood when we learn that it takes the product of 1,600 worms to make a pound of silk, and that the filaments required for this quantity of reeled thread, would make a continuous line over 150 miles long.

Reeling silk by improved methods is considerably on the lines followed by the Chinese and Japanese, with the advantage of accuracy, speed and utilization of much material that was at one time thrown away. In the improved process, the cocoons are soaked in large, deep pans to soften the gluten which covers them; after this they are beaten with a brush, which removes the outer layer of filaments that is used for inferior fabrics. Another soaking loosens the ends of the filaments and they are ready for the operatives, who take five cocoons at a time, place them in pans of hot water, which sit near the winding machine, and gathering the ends of the filaments pass them through an eye where they are formed into a single thread and swiftly wound.

When a cocoon is in good condition it will yield 300 yards of filament which unwinds easily, seldom breaking, although it is so small that it is almost invisible, and jerks the floating cocoon about, as a fisherman would his drifting cork. While the winding is going on the operative stands watchfully by, and as soon as a cocoon is divested of its silken covering—which is told by its ceasing to move—another is put in its place and the new filament joined to the others without causing any delay. When a filament breaks, the end is quickly caught and by its natural adhesiveness joined to moving main line.

Besides loosening the filaments, the hot water bath to which the cocoon is subjected, kills the pupa that, without this boiling, would, when fully developed, bite through the shell and destroy the silk which enwraps it. That is part of the business of the silk-worm. It is hatched from a little dotted slate-colored egg, casts its skin four times, lives on mulberry leaves a few weeks, and then from its head draws the filament, winding it about its body until the worm is seen no more. The weaver is silent in the glistening cocoon which swings to the winds in the swaying branch to which it is attached, until mysterious nature completes the metamorphosis in bringing forth the moth to sport a field, or man unwinds the silken chamber for costly tribute to my lady's vanity.

Nature's laws move on in patient fulfillment of the destiny of her decrees, giving to man that which his necessity calls for, revealing wonders in her divine processes that speak of the Master inspiration which directs her forces. But of all those subtle movements that the divine spark has given power, the mind of man stands pre-eminent in its psychic grandeur. Necessity called for invention, and the wheel thus started rolled on and on until the world is bewildered, astonished, delighted with the revelations of genius. If a natural product becomes too expensive, genius meets it with a substitute, if an obstacle is to be overcome, invention steps in and applies the power. Even the worm, which from remote ages put forth from his spinarets the wherewithal to clothe the human splendidly, has his rival in De Chardonnet who has a record in the Patent Office of his experiments in producing artificial silk from viscous liquids. Although the worm is still doing business successfully, a look into the inventor's method may be of interest. He says:

"The liquid that I employ is a non structural pyroxyline compound, being a kind of collodion, obtained by dissolving in a mixture of alcohol and ether a quantity of pyroxyline, a metallic proto-chloride reducing agent and a small quantity of an oxidizable organic base. The pyroxyline is obtained by subjecting purified cellulose, obtained from the chemical treatment of wood, straw, cotton, rags or unsized paper or other similar materials to the action of nitric acid, etc." When the liquid from which the artificial filament is produced, is made, it is spun by making it flow out through a minute orifice, so that the liquid filament as it comes forth enters into cold water and solidifies on its exterior, leaving the inside in a plastic condition. The filament is then drawn from the water and allowed to complete its solidification in the air, or facilitated in drying by a hot air chamber in which it is reeled.

Since taking out his first patents, De Chardonnet has been endeavoring to improve his invention. Thanks to an enlightened civilization, the trials of M. Jacquard and other famous inventors who suffered through the malignant ignorance and superstition of their fellowmen, can no longer hamper the efforts of genius in pushing the great wheel of progress. If a man has an idea, the world looks and waits for him to work it out. If he fails, "it was not a good idea." If he succeeds, "long live the king."

When it is proven that silk can be reeled in this country profitably, a great field of industry will be open. We have every natural requisite for domestic sericulture, and the work is so simple that the spare time of farmers, wives and children can be utilized at a profit in growing cocoons and preparing them for market. The time will undoubtedly come when all the branches of the silk industry will be carried on in the United States, giving employment to many thousands and bringing in much government revenue.

NEWS CONDENSED.

Aug. 1—War on China was formally declared by Japan.

Aug. 2—The trial of Caserio, the murderer of President Carnot, begins at Lyons, France.....Three hundred men resume work in Pullman.

Aug. 3—Caserio was found guilty and sentenced to the guillotine.

Aug. 4—The Vigilant wins the match at Cowes over the Britannia by four minutes and twenty-nine seconds.....Cincinnati railroad strikers petition for their old jobs without success.

Aug. 5—Patti Rosa, the actress, dies in New York.....The National pawn shop in Paris burned; loss 2,000,000 francs.

Aug. 6—The Vigilant again defeats the Britannia and the Satanita.....Chicago switchmen declare the strike off.....Ex-Governor Austin Blair, Michigan's war governor, dies at Jackson, aged 76.

Aug. 7—The troops at Chicago and Pullman are ordered home, thus ending the strike service of the Illinois State militia.

Aug. 8—The Galvin and Thomas divisions of Commonwealers are sent back to their homes by Washington authorities.....Great Britain and Russia are unable to effect a settlement of the Japan and China trouble.

Aug. 9—President Cleveland finally sends a letter to President Dole, recognizing the new Republic of Hawaii.....Twenty-eight houses are wrecked at Scranton, Pa., by a cave-in mine.

Aug. 10—Thirteen persons were killed in a railroad wreck on the Rock Island, near Lincoln, Neb.....Both Japan and China are hurrying troops in large numbers into Korea.

Aug. 11—An action is brought by the Attorney General of Illinois to decree void the charter of the Pullman Company.....By order of Governor O'Ferrall, the 274 Commonwealers camped at Roslyn, Va., were driven out of the State into the District of Columbia, from whence they were ticketed back to their former homes.

Aug. 12—The relay bicycle riders reached Denver, having made the distance from Washington, 2,037 miles, in six days, 10 hours and 17 minutes.....Cholera is reported on the increase at St. Petersburg.

Aug. 13—About 1,800 striking Pullman employees have applied for their old positions.....The House, after the decision of the Democratic House caucus, passed the Senate tariff bill without change, also passed "pop-gun" bills placing sugar, iron, coal and barbed wire on the free list.

Aug. 14—The President approved the bill to subject to State taxation National bank notes and United States Treasury notes.....Representative Clifton R. Breckinridge, of Arkansas, qualified as United States Minister to Russia.

Aug. 15—The tariff bill is presented to the President.....An anarchist plot to assassinate Premier Crispien is discovered at Rome.

Aug. 16—The centennial anniversary of the birth of William Cullen Bryant was celebrated at Cummington, Mass.....Caserio, the assassin of President Carnot is guillotined, at Lyons, France.

Aug. 17—China secures a war loan of \$5,000,000 in Germany.....Alix trotted the fastest three miles on record at the Terre Haute racing track.....Charles Robinson, the first Governor of Kansas, died at Lawrence, aged 76 years.

Aug. 18—The Senate passes a resolution against any further legislation in contested matters, which ends the tariff fight this session—The river and harbor bill becomes a law without the President's signature.....The Hawly silk mills at Port Jervis, N. Y., burned; loss \$500,000.

Aug. 19—The Japanese government decides on the issuance of a domestic loan of \$50,000,000.

Aug. 20—At Bedford, Mass., 11,000 textile mill workers struck against the reduction of wages.....An investigation by the Memphis grand jury shows that the State and county have been defrauded out of nearly \$2,000,000 in revenue during the past eight years.

Aug. 21—There was a \$400,000 fire at Memphis.....A big Four freight depot and about 20 sleeping and chair cars at Cincinnati burned; loss \$285,000.....Dispatches from Shanghai say that the Chinese drove the Japanese forces from Ping Yang after a long battle, with heavy losses, and later also drove them from Chung-Ilo.

Aug. 22—Representative Paschal, Texas, who voted for free wool, was defeated for renomination in his district by a candidate who is not an advocate of free wool.

Aug. 23—It is charged at Oakland, Cal., that the Southern Pacific Railroad has blacklisted the men who recently struck.....Twenty-five thousand mill operatives at Fall River, Mass., have been locked out.

Aug. 24—The general deficiency bill was signed by the President.....A fire in a mine near Seattle, Wash., imprisoned all the men at work; 37 bodies have been recovered.....Two men were killed and 11 badly hurt in a mine explosion at Ashland, Pa.....Four men were killed by the burning of a shaft house of a mine at Creede, Col.

Aug. 25—In the battle of Ping Yang, the Japanese are reported to have lost 1,300.....Ex-Speaker Reed opened the campaign in Maine by a speech at Old Orchard, on the tariff bill.....The Populists of the First Florida Congressional District, in convention at Dade City, denounced President Cleveland "for quelling the Chicago riots".....The Junior Order United American Mechanics will carry into politics their opposition to nuns teaching in public schools.

Aug. 26—Mrs. Henry Ward Beecher celebrated her 83rd birthday.....Ex-Vice-President Morton returned from Europe.....John Newell, president of the Lake Shore Railroad, died from paralysis at Youngstown, Ohio.

Aug. 27—The Tariff bill became a law at midnight without the signature of the President.....Secretary Carlisle decided that goods now in bond will be entitled to the provisions of the free list of the new Tariff act.....Miss Mary Desha, a sister of Colonel W. C. P. Breckinridge's late wife, issued a vigorous appeal urging the defeat of Colonel Breckinridge.....The Encampment of the Knights of Pythias began at Washington.

Aug. 28—Both houses of Congress adjourned.....The Supreme Lodge, Knights of Pythias, convened in Washington.....The Czar is said to be suffering from kidney troubles.

Aug. 29—President Cleveland left Washington for Gray Gables to be gone a month or more.....Congressman Wilson, of West Virginia, was renominated.....The Secretary of the Treasury decided that under the new Tariff law payments of sugar bounties on claims already filed cannot be legally made.....The veteran railroad official, John C. Gault, died at Chicago.....Its reported the Japanese have met with several disastrous defeats in Korea lately.

Aug. 30—Several hundred Commonwealers on their way West are stalled in Omaha unable to secure transportation; the county has refused further food.....A convention to promote Southern development was held at Washington, D. C.....Anti-vaccination mobs overpowered the health authorities in the smallpox stricken section of Milwaukee.

Aug. 31—Ex-Vice-President Morton addressed a letter to the Republicans of New York State, announcing his readiness to run for Governor or not, as they desired.....The Grand Jury at New Orleans adjourned after indicting 11 Councilmen and the City Engineer for "boodling".....Robert L. C. J. Hamlin's pacer, went a mile at Fort Wayne, Ind., in 2:03 1/2, the greatest record in the history of harness racing.....Over 1,000 lives were lost by a fire on the flower boats in the Canton river.

Nature and Policy of Letters Patent for Inventions.

Although an inventor has no property in his invention independently of positive laws, it was early admitted that he has peculiarly a just title to the advantages of his invention, and the public, in order to induce him to exert his genius, employ his time and expend his money in the production of something new and useful to the community, recognized that some legal provision to secure to him the fruits of his toil and genius was necessary. It is contrary to every day human nature to sow where it can not hope to reap. But the question, "What kind of inducement is the most proper to be offered to the inventor?" has given rise to much discussion. Premiums, state rewards and purchase of the invention outright by the state, each has had its advocates. That letters patent conferring a limited monopoly is the most equitable and conformable to the interest of the people at large and to the inventor individually, appears to have been the prevailing opinion of all writers who have dealt exhaustively and impartially with the subject. The inventor is not singled out from among all the people and rewarded simply because he is an inventor. He is reimbursed for the practical activity of his labor and genius because as an inventor he promotes the progress of the sciences and useful arts and thereby accelerates and develops the comforts, conveniences and luxuries of the public. It is the benefit to itself that the public first considers, and if the day ever comes when the public receives from the inventor less than it pays him, the patent system, doubtless, will be abolished. It seems but just, however, aside from the actual gain to the public, that he who gives it a new method of increasing the material happiness, should in recompense therefor, himself gather the first fruits of his labor and ingenuity. Hence is found one of the favors in which letters patent, as the means for conferring this recompense upon the inventor, have been held both by him and the people, for letters patent give a strictly equitable and ordinarily early remuneration to the patentee without any risk of loss to the public at large, such as premiums or rewards or state purchases involve. And in proportion as the invention is valuable to the people so will the amount of the patentee's own profits accrue. John Stuart Mill, in his "Principles of Political Economy," says: "The condemnation of monopolies ought not to extend to letters patent for inventions, by which the originator of an improved process is allowed to enjoy for a limited period the exclusive privilege of using his own improvement. This is not making the commodity dear for his benefit, but merely postponing a part of the increased cheapness, which the public owe to the inventor, in order to compensate and reward him for the service," and, further, that the grant of a patent is the only method of securing a reward to inventors according to the merit of their inventions, "because," as Mr. Mill says, "it leaves nothing to any one's discretion and the greater the usefulness the greater the reward, and because it is paid by the very persons to whom the service is rendered." The clearest insight into the character of patent privileges, says a profound writer on the subject, is obtained from considering them as the result of a contract entered into by the state, as representative of the public, with the patentee. A contract is based upon a consideration, not a custom, prescription or mere sentiment. The idea that a patent is issued as a gratuity, as one would give alms to worthy but unfortunate persons or to keep up a church, is wholly incorrect. Patents are granted as pay for services rendered the public, and, doubtless, if it were possible for the government, the agent of the public, correctly to estimate the money value of the invention, the people would just as lief pay the inventor in spot cash as to pay him by a patent. The parties meet on the understanding that the one has a useful invention to communicate, the other to pay for it in return for the communication to it of such invention. The conditions required of the patentee are that he really has an invention and honestly communicates it.

As early as the year 1800 the English judges laid down the correct principle that patents are to be judged as bargains between the inventors and the public, to be judged of on principles of good faith, and to be construed as other bargains. It is in this light, then, that a patent system is to be successfully upheld. To estimate fully the real nature of patent privileges, writes another authority on patent law, we should view them in connection with the class of

interests to which they belong, viz., those created for the self-remuneration of public benefactors. The kindred privileges are those of the capitalist and the author, incorporated companies, on the score of large capital or extreme risk on the one hand, and copyright, including the protection of designs, for purely intellectual skill, upon the other. Each, from its mode of creation and the subject it comprises, possesses distinctive features of its own, yet thus far they have a similarity in principles of natural justice and public policy, and as being the means of rewarding with the first fruits of their own efforts those whose industry, enterprise and skill the commerce, manufactures and arts of a country originate and improve. In each case the field of adventure must be new; public rights, therefore, can be hardly said to exist, while the prospective advantages to the public from the discovery are such as reconcile them to the temporary abstinence imposed. Any misunderstanding with reference to the rights of patents is mainly referable to the insufficient attention paid to the relation which the patentee bears to the community at large. The general principles on which the relation stands may be accepted however, as sound, since they have been adopted by almost every state of modern times of any considerable advancement in the industrial arts. The law under this head must be regarded as a compromise, so far as natural right is concerned; the application of a law of nature or a property of nature, a philosophical or an abstract principle, is capable of exclusive appropriation only so long as the secret of such application is retained within the inventor's breast. Once passed, any observer of it may make the same application of it, in other words, it becomes the property of all mankind, and nothing but principles of justice and public policy can be permitted to restrain the instructive desire of all men to adopt manifest improvements. Whatever, therefore, the abstract right of the inventor in and to his invention is in order that such property may be of value to him commensurate with his part in having originated it, society must interfere by imposing penalties and affixing prohibitions on its infringement. But of the objects proposed to itself in fixing these prohibitions, that of procuring the satisfaction of public wants must and do take precedence of society's desire to reward ingenuity and skill.

This fact is strongly brought out and emphasized by that feature in the patent laws of all countries, which requires that the invention must be useful, that is to say, it must be beneficial to society. For example an inventor may display marvelous inventive ability in contriving a gambling device, designed and intended solely to be used as such, and yet society would refuse to grant him a patent therefor notwithstanding he was none the less an inventor. Such invention would not promote the progress of science and useful arts. The invention must also be useful in the sense that it is capable of producing the result it is designed to produce. For a long time inventors were seeking to contrive a threshing machine. Finally one party evolved the cylinder, with teeth in its outer periphery, rotating in a concave that had no teeth, the combination was useless to thresh wheat, but the very foundation idea which led to the practical evolution of a threshing machine was there and some less ingenious man, perhaps, by adding teeth in the concave produced the thresher. The first man was an inventor of the highest order but he could obtain no patent because he had stopped short of giving to society a practical device. So it is with men of science who merely discover natural laws and physical truths. They may be a Newton, or a Faraday or a Henry and yet, because they do not apply their discoveries practically society gives them no patents. A pigmy in intellectual abstraction having a Newton to explain him the laws of gravitation might be ingenious enough to apply them in a useful way to fulfill the needs of society and society would contract with him by a patent for the purchase of this practical way; yet as between the two men Newton had the greater mind, but the pigmy in abstract thought gave society the material, concrete results of Newton's knowledge and they are what society can bargain for and give a patent in payment for.

The duration of the exclusive right of the inventor to his property has been reduced to a term of years, as the course most beneficent to public interests.

The value of property of this kind in a country where capital is abundant and flows freely into new channels, can hardly be overrated. In some cases an industry could not be established but by its means; others are but partially affected by it; while in those cases in which there is a limited market for consumption or a limited area of supply, it hardly enters as an element at all. It may be remarked, that the circumstances determining the legality of such grants have never been expressed in a form more accurately applicable to the subject at the present day than in the words of Lord Coke in the case of *Darcy vs. Allen*:—"Now, therefore, I will show you how the judges have heretofore al-

lowed of monopoly patents, which is, that where any man by his own charge and industry, or by his own wit and invention, doth bring any new trade into the realm, or any engine tending to the furtherance of a trade that never was used before; and that for the good of the realm, that in such cases the King may grant to him a monopoly patent for some reasonable time until the subjects may learn the same, in consideration of the good that he doth bring by his invention to the Commonwealth, otherwise not." To doubt the justice and wisdom of securing the inventors the first fruits of their productions would seem to involve a doubt of the desirability and advantages of improvements in the sciences and arts. Without invention there can be no progress in material things, and if the community is to be allowed to avail itself of the ingenuity of the inventor without having to share the labor and expense he incurred in bringing his ideas into a practical shape, such expense and labor would be undergone by nobody except he were a philanthropist, and also wealthy enough to afford to devote his genius to the advancement of his fellow man. Even as it is, with the pay afforded by a grant of letters patent, the meritorious inventor rarely reaps a pecuniary harvest at all commensurate with the splendid seed of his genius and its patient cultivation. Can any one correctly calculate the value to England of the inventions of Hargreaves, Arkwright and Watt and a host of others? Aye, more than this, how much indeed does not the whole world owe them? Can you by searching find out a single name in the history of civilization that can at all compare with that of James Watt? Without any disparagement of the transcendent fame of statesmen, law-givers and military heroes. One must recognize the evanescent glow of the good they did for their day and generation and posterity too as compared with the permanent value of the work of the great inventor. No one can read history, nor, in fact, observe the daily advancement of mankind without being impressed with a profound sense of the invaluable services of the inventor and that he should be paid for the material results of his toil and genius, and all things considered, can anyone successfully suggest a better mode of paying him than by prohibiting others for a definite number of years from imitating his invention without his consent?

LEVIN H. CAMPBELL.

A Spanish Bull Fight.

Dr. H. R. Porter, in Bismarck (N. Dak.). Tribune, writes from Madrid, giving the following account of the great Spanish national sport:

I witnessed a bull fight at the Plaza de Toros, which is a vast amphitheatre, calculated to hold 20,000 people. Every seat was taken. The first bull that was let into the ring came with head and tail high in the air—a noble brute certainly. He looked at the vast audience as he came proudly in, and then at the gaily clad bull-fighters (Banderilleros), and, quicker than a flash, he plunged for one and then another, and another, only, of course, to miss them and to hit the red cloth held before him. The bull looked surprised and became furious, pawed the ground and lashed his tail, and started for a man on horseback. The man did not falter, but rode toward the bull and charged him with a spear. The bull was equal to the occasion, and rushed on horse and rider with the speed of lightning and the force of a battering ram. Down went horse and man. The bull turned immediately in pursuit of more game, which he found in another horse and rider and another and another, until in thirty-five minutes he had actually killed seven horses. The first poor animal was completely torn open so that portions of his intestines came out and dragged on the ground. Still the rider urged him on and rode him around the ring until he fell down dead.

And this they call sport. It is one of the most cruel, barbarous and disgusting sights I have ever witnessed, and I never want to see another one. In the meantime the bull was charging around from one man to another with his tongue out, his sides panting, blood-shot eyes, and his sides covered with blood, and dripping to the ground, from sharp arrow shaped instruments which were thrust into his flesh, and barbed so as to tear and cut his flesh and thus madden him more. This sort of thing lasted until the suffering bull could not stand it much longer from loss of strength and blood. A trumpet was sounded, which was the signal for the finishing stroke, and one of the fighters (Matador), rushed up on the bull and thrust a long sword into his shoulder up to the hilt. The blood rushed from his nose and mouth. He stood still a few seconds, quivered and fell down dead upon the body of one of the seven dead horses, and they were dragged out, during the uproar of 20,000 voices, by gaily decked mules, and the thing was over in less time than I've been telling you. This, however, was only one-sixth of the fight, as they had five more bulls left to go through the same performance. One was enough for me, and I left sorrowful and disgusted.

BUSINESS SPECIALS.

Advertisements under this heading 20 cents a line each insertion—seven words to the line. Parties desiring to purchase valuable patents or wanting to manufacture patented articles will find this a valuable advertising medium.

WANTED.—A partner with \$250 to invest in a new patent Excelsior Machine. There's merit in it. Address James Worth, Union City, Ind.

WANTED.—An agency for Philadelphia or New York, of one or more articles of merit. Can furnish some capital and have plenty of energy to push the sale of anything having merit. Address, giving full particulars, "S. A. P." care of Inventive Age, Washington, D. C.

WANTED.—A partner to furnish means for patenting an immensely profitable invention, a Slot Machine for Retailing Cigars. Machine receives all coins from a penny to a dollar, gives correct change, and produces cigars from box. For further particulars address David R. Huston, Hubbard, Minn.

WANTED.—To sell or place on royalty. Paper File; holds any number from 500 to 10,000. Any paper can be removed and replaced without interfering with any other. Best ever invented. Address A. Armstrong, Box 141, Noblesville, Ind.

WARNING.—Do not manufacture or use that French Hand Cultivator advertised in the Philadelphia Record May 24. It is an infringement on my patent, 444,366, advertised in Inventive Age, March 22, 1892, and in American Inventive Progress, Indianapolis, 1893. F. T. Neilsch, Houston, Texas.

WANTED.—A partner who will loan me \$100 for one year and take one-third interest in valuable and inexpensive invention. For further information address E. W. Barton, Windsor, N. Y. 9-10

WANTED.—To correspond with inventors with a view of selling State rights. Invention must be practice and useful. Address J. S. Busselle, care of Inventive Age.

Electric Flashes.

The Portland, (Ore.) Cable Railway Company will adopt electric motive power.

Fifteen years ago there was not a telephone exchange in the United States. Today there are 1,400 employing 10,000 persons and furnishing service to nearly 250,000 subscribers.

A lilliputian electric light has been invented for the benefit of newspaper reporters. It is fastened to the end of a pencil, so that the reporter may carry his own light with him and be able to make his notes even in the darkness.

The estimated saving to the Metropolitan Elevator railway, of Chicago, by the substitution of electricity in place of steam locomotives is \$300,000 per year; \$200,000 of this is the saving in fuel due to using bituminous coal in stationary boilers in place of the anthracite necessary with the locomotives. The remaining \$100,000 represents the saving in the wages of the locomotive engineers and other smaller economies.

Of the possibilities of electricity the prospectus of proposed "National School of Electricity" to be established at Chicago under the auspices of Edison and a number of other eminent electricians, says: "More than \$800,000,000 is employed in electrical pursuits today, and these figures are being increased at the rate of \$100,000,000 annually. Within a decade nine-tenths of the steamboating, railroading, canal hauling, illumination, domestic lighting, heating, cooking, factory operation, mining and machinery will be done by electricity. There are also many applications of electricity yet in an undeveloped state. Electricity is the most promising field in civilization today."

The Manufacturers' Record announces the close of a big deal which promises to have an important bearing upon electric operations in this country. The Wunstrum Company of Baltimore, which has a capital stock of \$1,000,000, has sold out to the Ft. Wayne Company, of Ft. Wayne, Ind. This deal puts the Ft. Wayne Company in control of patents which, it is said, are being infringed by other electric manufacturers and the Ft. Wayne Company will, it is said, immediately begin and active fight upon all who are reported as infringing upon its patents.

Personal.

Edward P. Thompson, the well known New York patent attorney, announces that he has associated with himself Professor Wm. A. Anthony, who was for fifteen years prior to 1888, Professor of Physics at Cornell University, and for a long time in charge of the department of electrical engineering. He is past president and member of the American Institute of Electrical Engineers, and author of many scientific articles and text books.

Hon. George B. Shaw, who died at his home in Ean Claire on the 27th, was well known to a great many electrical men, having had charge of the Ansonia Company's World's Fair Bureau last year. He was a successfully politician, and left a wide circle of friends. He was Supreme Chancellor of the Order of the Knights of Pythias from 1890 to 1892.

Disbarred.

The following attorneys have recently been disbarred from further practice before the Patent Office:

L. W. Scheuermann, Hudson, Wis.; Vincent Anderson, Quincy, Ill.; Samuel M. Cecil, Traveler's Rest, Ky.; J. S. Armstrong, Xenia, Ohio; A. F. Posey, Vicksburg, Miss.; Thos. Caldwell, Chetopa, Kansas; B. F. Brown, Pittsburg, Pa.; Wm. H. Kerr, Salineville, Ohio.

AFTERMATH.

The American Tin Plate Co., Elwood, Ind., have nine mills in operation and employ 600 hands.

THEODORE T. DORMAN, of Upper Montclair, N. J., has been appointed a fourth assistant examiner in the Patent Office, at a salary of \$1,200.

On the 27th ult. the sheriff levied executions aggregating \$115,000 on the works of the Diamond Drill Company, at Birdsboro, Pa.

It is said that the Wagner car shops at East Buffalo will close down owing to business depression and the absence of demand for cars. Over 1,000 men will be thrown out of work.

It is officially announced that hereafter an uncertified copy of every decision or action by any tribunal in the Patent Office will be furnished by such tribunal to the interested party or parties without charge.

THE Electrical World reviews the business situation and concludes that "we are once more on the high road to prosperity and that each succeeding month will add to the impetus, even now so strongly apparent."

The forty-third meeting of the American Association for the Advancement of Science began in the Polytechnic Institute and the Academy of Music, Brooklyn, N. Y., on August 15, and continued until August 23. The attendance was fair and the papers interesting.

ONLY four out of the 42 Fall River textile mills are in operation. The owners and operatives remain widely apart on the wages question. The situation at New Bedford is said to be improving but still less than one-third the total capacity is in operation.

The Pennsylvania Steel Company at Harrisburg, Pa., will shortly engage 1,000 workmen, in addition to the 3,500 men now employed. The increase in force has been made necessary by the receipt of a number of orders which will keep the works busy for six months or longer.

SOMETHING new in Mexico is a jute mill costing \$500,000, which is being erected at Orizaba, by an English company, with the most improved machinery and electric power. The electricity is conveyed a mile and a half to the mill from a waterfall 115 feet high, giving, it is reported, 11,000 horse-power.

A mortgage on one of the largest machinery plants in the United States was recorded at Milwaukee, recently. It was executed by the Edward P. Allis Co., to the Northwestern Mutual Life Insurance Co., of Milwaukee. The amount is \$340,000. It covers all the lots and buildings of the corporation, and is due in five years from July 30, 1894.

The latest railway company to decide upon the equipment of its line with cable power is the Columbia Railway Company, of Washington, D. C. This company owns six miles of track which extends from the Treasury, 15th Street and New York Avenue, along New York Avenue, Massachusetts Avenue and H Street to the boundary N. E. The officers are: President, R. T. Baker; vice-president, E. G. Davis; secretary and treasurer, James B. Adams; superintendent, Wm. C. Bateler.

This is a great country, with boundless resources and wonderful opportunities, and now that the tariff question is settled and Congress is about ready to adjourn it is not reasonable to suppose that these hard times can continue much longer without amelioration. Prices can not advance to the old figures of a few years ago; labor cannot receive its old wages; but the demand for all products must now increase; there is plenty of money to pay for them; and with this increased demand must come better times for capital and labor.—*Bulletin of the American Iron and Steel Association.*

Summer Vacation Tours.

The Baltimore and Ohio R. R. Co., now has on sale at all its offices east of the Ohio River a full line of tourist excursion tickets to all the lake, mountain and sea-shore resorts in the Eastern and Northern States and in Canada. These tickets are valid for return journey until October 31st. Before deciding upon your summer outing it would be well to consult the B. & O. Book of "Routes and Rates for Summer Tours." All B. & O. Ticket Agents at principal points have them, and they will be sent post paid upon receipt of ten cents, by Chas. O. Scull, General Passenger Agent, B. & O. R. R. Baltimore, Md.

Who Has Back Numbers of Inventive Age?

THE INVENTIVE AGE wants the following back numbers and will be pleased to pay all expense of postage.

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THE INVENTIVE AGE,
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THE INVENTIVE AGE one year and any one of the popular and instructive books as per offer in another column, under heading of "Popular Scientific Books,"..... \$1.35

THE INVENTIVE AGE one year and any one of the "Excelsior Edition of Standard Poets," mentioned elsewhere in this magazine..... \$1.35

THE INVENTIVE AGE one year and a copy of "Picturesque Washington," 260 pp., 136 illustrations, Stilson Hutchins' famous book, former price \$2, sent to any address in the United States..... \$1 35
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THE INVENTIVE AGE one year and Robt. Grimshaw's famous book "Tips to Inventors,"..... \$1 50

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THE INVENTIVE AGE has made arrangements whereby it can furnish the complete set of World's Fair views—220 in all—at a nominal figure. These views are not cheap wood cuts but fine half-tone cuts covering every important feature of the greatest of the world's expositions. THE INVENTIVE AGE one year, and this set of views will be sent to any address, postage paid for \$1.35.

Still another great offer is that of the People's Atlas of the world—maps and statistics corrected up to 1884—124 pages—maps of every state and every nation—a complete Atlas, with over 300 illustrations, usual price \$3 to \$5. We will furnish THE INVENTIVE AGE one year and send the Atlas to any address, postage paid for \$1.35. Reliable agents wanted in every county in the United States. Send for terms to

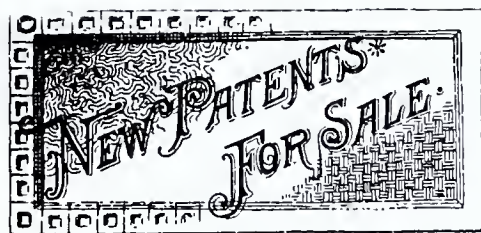
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Low Rates to Denver, Col.

The Baltimore & Ohio R. R. Co. will sell round trip excursion tickets to Denver, Col., from all points on its lines east of the Ohio River, August 8th, 9th and 10th, valid for return passage on trains leaving Denver August 19th, 25th and September 13th.

The rate from Baltimore and Washington will be \$47.40 and correspondingly low rates from other points.

Passengers taking the B. & O. have a choice of routes, going via Pittsburg, Akron and Chicago; via Grafton, Bellaire and Chicago, or via Parkersburg, Cincinnati and St. Louis; double daily service of express trains, with Pullman sleeping and dining cars on all routes.



Advertisements inserted in this column for 20 cents a line (about 7 words) each insertion. Every new subscriber sending \$1.00 to THE INVENTIVE AGE will be entitled to the AGE one year and to five lines one time FREE. Additional lines or insertions at regular rates.

FOR SALE.—Patent No. 524,279, Rocking Chair. Enables occupant, through easy push on the rocking foot or arm rest, to swing and rock combined. Adjustable parts. State and county rights for sale. Address John Koltmann, Leannette, Pa.

FOR SALE.—Cheap if patent is sold at once, patent No. 524,206. The greatest thing on the market; oil or liquid measure and filler; does away with measures and funnels. A fortune in it; unlimited sales. W. Keepers, Philadelphia, Pa.

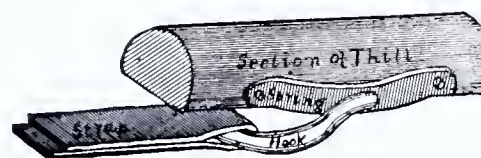
FOR SALE.—Patent No. 509,673; Step or Extension Ladder; sells on sight; change made in a moment; strong, light and durable. No ropes to wear out, nor springs to loosen. Town, county or state rights for sale. Exclusive territory given. Address the inventor, W. J. Osborne, Sonora, Steuben Co., New York.

FOR SALE.—Patent No. 522,202; Hand Truck; a pivoted toe-section connected thereto and means for operating it. The best hand truck ever invented. Will send copy of patent and specifications to any one desiring to investigate a good thing with a view to investment. Will sell patent on good terms. Address, Joseph Frenette, Chippewa Falls, Wis.

FOR SALE.—My patent, No. 523,388, anchor for check-row planter. Address, J. Valentine, Aplington, Iowa.

FOR SALE.—My patent, No. 522,695, dated July 10, 1894; Buggy or Bottle Washer, to connect with water hose. Will revolve a brush in applying water. Kindly give me an offer. Address C. A. Palmquist, 1725 1st avenue, W., Spokane, Wash.

FOR SALE or royalty, patented May 29, 1894, No. 520,612 Unique Thill Strap Hook or



Holdback Fastener. Write Wm. Rice, Rome, Pa. 9-11

FOR SALE.—Patent No. 503,781, dated August 22, 1893; Novel Coal Elevator for Transferring Coal from Boats. Great saving in power. For further particulars address patentee, W. F. Austin, 328 Second street, Albany, N. Y.

FOR SALE.—Allen Braced Wire Fence. New patent using bridge principles. Strong and simple, state and county rights. Circulars on application. J. E. Allen, 53 Ross St. Williamsport, Pa. 8-6

FOR SALE.—Patent No. 524,358; Improved Doubletree. Will sell or place on royalty. Geo. H. Talbot, Lansing, Mich.

FOR SALE.—A broad patent for an improved lumber drying system of great simplicity. Dries lumber without checking at a greatly reduced cost of heat, time and labor. Absolute safety from fire. Highest testimonials as to efficiency by those who have given it a trial. Address the owner and patentee, Lafayette Moore, Cordela, Ga.

FOR SALE.—Patent post-hole digger. Will dig any size post-hole wanted with less labor than any other. Will place on royalty. H. Paulson, Sumner, Washington.

FOR SALE.—Patent No. 520,460, issued May 29, 1894, Kitchen Cabinet; will sell entire right U. S., by States or divisions, cheap for cash or satisfactory terms. Best household article known; a novelty; can be made cheap. Address, Minnie S. Thomas, Waterville, Wash.

FOR SALE.—One of the most practical inventions out—Dust and Fire-Proof Ash Sifter. Being dust proof it is especially adapted for kitchen use in sifting ashes. A great fuel and time saver. Can be cheaply made. Something every housekeeper will want. State and county rights for sale. Address R. Davis, 636 H street, S. W., Washington, D. C.

FOR SALE.—Outright or State rights, patent granted September 26, 1893. No. 505,610, Improved Fruit Drier; thoroughly tested, good testimonials. Address, A. Jones, Pratt and President Sts., Baltimore, Md. 8-10

FOR SALE.—Patent No. 522,342, Hospital Bed, dated July 3, 1894. An invention that has merit; one that is practical. Address A. Helander, Sisters Hospital, Los Angeles, Cal., Box 438.

"Tips to Inventors."

This is one of the most instructive and useful works for mechanics and inventors. Its author is Robert Grimshaw, M. E., and the book, cloth bound, retails for \$1. THE INVENTIVE AGE for one year and "Tips to Inventors" will be sent to any address for \$1.50

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE, which keeps inventors posted in the art in which they are mostly interested. — The full address of any patentee, and number of patent found below sent to any address on receipt of one 2-cent stamp. — We will send, postpaid, to any address, printed copies of any U. S. patents, with specifications and drawings, upon receipt of 20 cents for one copy; 35 cents for two copies; 50 cents for three copies. — (See premium offer elsewhere in this issue.) — Address THE INVENTIVE AGE, 8TH AND H STS., WASHINGTON, D. C.

LIST OF PATENTS

GRANTED FOR INVENTIONS,
JULY 31, 1894.

Accordion, zither. T J Muller.
Air compressor, double acting hydraulic. J H Clump.
Ammonia, making. J Sternberg.
Arc rupturing device. G T Voorhees.
Armature for dynamo electric machines. H F Parshall.
Armature for dynamo electric machines. H G Reist.
Awning, window. D Jones.
Baling press. M C Nixon.
Bar fixture. M Bensinger.
Battery plates, making secondary. W L Silvey.
Battery plates, making stiffened connectors for secondary. W L Silvey.
Beam straightening apparatus. J F Lindahl.
Bed, folding. L B Shelton and N Gentry.
Bell. W R Mackay.
Bell, door. B S Cowles.
Belt, sword. S N Bickerstaff.
Beverage vessel. J M Van Fleet.
Beverages, apparatus for charging and drawing carbonated. E Stahl.
Bicycle 2. F H Peck.
Bicycle seat post. A Perkins.
Bicycle supporting attachment. H W Woodward.
Bicycle wheel. G H Chinnock.
Bicycles, etc., driving mechanism for. W P Jencks.
Bit and mouth opener combined. R N Harris.
Blower, centrifugal. W H Harrison.
Boiler. J J Long.
Boiler furnace. W W Dean.
Boiler furnace. Z E Moon.
Boiler furnace, steam. E T White and W S Forrester.
Boiler furnace, steam. H Wilms.
Boiler tube cleaner. R T Brooke.
Boiler, water circulating, feeding and discharging apparatus for steam. B B Morrison.
Bone cutting machine. F W Mann.
Bottle. H A Bierley.
Bottle neck. L A Pells and L Steiner.
Bottle packing case. W P Lowrie, R Barr, and G Scott.
Bottle, siphon. J Werscrean.
Bottle stopper. F W Palmer.
Bread in ovens, means for deodorizing and sweetening. M Zoeller.
Bricks, tiles, etc., machine for pressing. J Leonhardt.
Buggy seat. C Gussett.
Calendar, record, biographical, and memorial. J E Whalen.
Can cleaning machine. J R Rowlands.
Car brake. J T Duff.
Car brake. M McNulty.
Car coupling. J P Kirk.
Car fender. E Thomas.
Car life guard, street. G A Parmenter and C S Gooding.
Carding machine, condenser or finisher. J Cronie.
Cartridge holder. M H Durst.
Caster. F Mann and H H Akers.
Caster, furniture. J T Vegliard.
Caterpillar trap. T D Noone.
Chain, drive. E A Baldwin.
Chair. L C Lazar.
Chlorids, making liquid. A Sommer.
Chuck, emery wheel. J T Gildin.
Clute for loading vessels, cars, etc. J M Dodge.
Cigar piercer. C Horn.
Circuit closer, automatic. J W White.
Clothes line reel. A W Foster.
Clutch, friction. T A Western.
Coffee boiler. J W Carpenter.
Comb. J W Howlett.
Comb for fiber feeding machines, revolving. J C Potter.
Commutator for dynamo electric machines. J Hoffman.
Composition of matter and making same. A P McKean.
Copy holder. J Rush.
Corset. L H Foy.
Conveyor. K Michalonski.
Cot, chair. C C McPhee and J E Brock.
Crane. A Grafton.
Creamer, centrifugal. D J Davis.
Crushing and grinding machine. W H Howland.
Cultivator, sulky. F G Hoffheins.
Cupboard for toilet utensils. C E Wendt.
Current generator, alternating. E W Rice, Jr.
Cutter cylinder for feed cutters. G S and R C Anderson.
Disinfecting apparatus. W M Brinkerhoff.
Pitching machine, traction. J R Hill.
Door, hinged sliding. A Sinclair.
Door operating device 2. J Rawle.
Drawing instrument. E L Sanderson.
Dredger. S P Hedges.
Dredger, steam vacuum. L Hussey.
Dredging apparatus 3. E Chaquette.
Dredging apparatus, rotary pump for. E Chaquette.
Drilling apparatus. J Conner.
Dyeing. C Duisberg and P Ott.
Ejector and firing pin operated by main spring. C A Young and S H Barton.
Electric circuit testing device. G A O'Neill.
Electric converter. J A Cabot.
Electric machine dynamo. E Thompson.
Electric machine or motor, dynamo. W H Knight.
Electric meter. T Duncan.
Electric meter. E Hartman.

Electric switch. G E Linton.
Electro expansion device. E Thompson.
Electrotypes, making. A W Harrison.
Engines with water or other cooling liquids, apparatus for supplying jackets of gas. F Hirsch.
Fan. A T Gwerdinski.
Fare register. L Ehrlich.
Fare register, street car. E H Duchemin.
Fence post. M Rhoades and C L Fluck.
Fences, metallic post and fastener for wire. E F Saxton.
Fertilizer distributor. F G Hoffheins.
File and press copy book, combined letter. M E Stephenson.
Filtering apparatus, protector against tube breaking, and self active closing apparatus, water. R Krix.
Finger nail trimmer. H La Casse.
Firearm sight. L A Favie.
Fire escape. P J Minshall.
Fire extinguishers, valve for automatic. S S Adkins.
Fire extinguishing system. O Pierce.
Fire hose spray nozzle. M H Hart.
Fruit drier. D E Sampson.
Fuse, shell. D Conekin.
Galvanic battery. C E Buell.
Galvanic element. A Heil.
Game apparatus. J R Rowlands.
Garbage furnace. J B Wayt.
Gas motor engine, reactionary. W A Shaw.
Gate. C C Aikman.
Gates automatically, device for opening or closing farm. F M Tribbett.
Grinding machine, drill. J J Kenyon.
Guns, movable cocking shoulder for breakdown. F A Hollenbeck.
Hair pin. L Onsey.
Harness. W E A Pipher.
Harvester. P Hanson.
Hat packing rings, machine for automatically making waste board strips for. E P Ferry.
Hay cocker. E B Keith.
Heating apparatus, steam. R M Dixon.
Hook and eye. H S Wedmore.
Horseshoe. J A Epper.
Hot water boiler. D Munson.
Hydraulic compress. W W Bierce and A Thonfinson.
Hydraulic compress, steam. W W Bierce.
Hydrocarbon gas black machine. P F Reddon.
Ice cream freezer. L and J D Wallace.
Ice elevator plane. J P Smith.
Indicating machine. M H Tompkins.
Injector. R G Brooke.
Ink. E Nienstaedt.
Inking device for duplicating manuscripts. J O Deckert.
Insulating block. H P Ball.
Iron and aluminum, making compounds of. O Schmiedeberg.
Knitting machine, straight. J G Powell.
Knitting machine, straight. H Stoll and F Maercklin.
Knitting machines, extra thread feeding device for. J G Powell.
Ladder extension and shelf, step. G J Leach.
Ladder lock. C P Bushnell.
Ladder, wooden. J T Knox.
Lamp, electric arc. J B McKeown. (Re-issue.)
Lamps, bushing for electric arc. T J Honck.
Lasting machine. S W Ladd.
Lathe. W T Wood.
Level. H Hughes.
Lifting jack. A A Smith.
Lifting jack. E R Stilwell.
Line discharger, automatic. J F Gauduxer.
Lock. C W Brown.
Lock. E Cazin.
Loam pile wire. G Segschneider.
Map case. W P Hussey.
Measuring device, weaver's. F X Caron.
Mechanical movement. J Linton.
Metal, combination tool for nurling, milling, screw cutting, turning and grooving. P A H Frederick and J M Riedel.
Milk, condensing and preserving. B F McIntyre.
Mop head and wringer, combined. J H Jewett.
Mower, lawn. A C Kent.
Mower, lawn. L C Stark.
Nest, hen's. J W Kaster.
Newspaper stand. M Forst.
Nipple holder. O B Hall and G H Graves.
Nut lock. E J Beckell.
Oil burning apparatus. J W Morris.
Oil extracting apparatus. W O Robbins.
Oil tank retarding attachment. F W Maley and J H Martindale.
Oils, desulfurizing mineral. A Sommer.
Oiling loose wheels or pulleys, means for. M Leitch.
Ordnance, breech loading. W Gross and C Politt.
Ore concentrator. T C McCreery.
Ore sampler. G L Hooper.
Ore sampling machinery. G D Potter.
Ore, winning metals from magnetic iron. E Nienstaedt.
Organ player, automatic. J A Brodin.
Overseam for fabrics. H H Fefel.
Packing, piston rod. E F Lewis.
Paddle wheel and rudder, stern. J M Mitchell.
Paper cutter, reversible. F Peters.
Paper delivering machine, coin controlled. G A Hastings.
Pen or pencil case. F J Hille.
Phonograph, coin controlled. T H Macdonald.
Pill machine. M R Christler and H M Smith.
Pipe wrench. C Hall.

Pipe wrench. D P Stanton.
Planter, potato. D W Baldwin.
Plastering retarder and making same. W M Dawson.
Potato cutter, seed. H C Odell.
Press. E C Williams.
Pressure regulator, fluid. C H Veeder and E D Priest.
Printing press, embossed. J Y Johnston and B F Bergh.
Propelling mechanism for carousels, etc. C Braaf.
Pump. C H Chandler.
Pump, electromagnetic reciprocating. C J Van Depoele.
Pump, portable barrel. M B Brooks.
Pump regulator. W B Mason.
Rail joint, suspended. O H Lang.
Railway check and indicator. J Lord and T R Leason.
Railway gate. A Barre and E Carrier.
Railway guard, street. W T Vose.
Railway rail joint. C B Herman.
Railway signal. F E Kinsman.
Railway signal, electric. C A Hammond.
Railway trains, electric signaling apparatus for. W H Baker.
Range finding, method of and apparatus for. B A Fiske.
Reading case. T W McGrath.
Rein holder. D D Horton.
Rivet setting machine. E M Pope.
Rotary steam engine. W M Byrd.
Ruler, blackboard. B W Ahne.
Saddle. W B Hall.
Saddle, harness. J L Kock.
Safe, bank. D M Rothenberger.
Sagger. H Brunt.
Sand blast machine. J A Shoemaker.
Saw dressing machine. M Covel.
Saw filing and setting machine. J McAlister.
Saw, metal. C C Newton.
Saw sharpening machine. M Covel.
Sawing machine. J S Loomis.
Scow, dumping. A Williams.
Sealed can, hermetically. W H Edmunds.
Seaming and coiling sheet metal, mechanism for. F T Thompson.
Seaming sectional sheet metal pipes, machine for. A G Scherer.
Seed hulls and separating lint and hulls, art of and machine for detaching lint from cotton. J P Burnham.
Self closing switch. C N and H P Lenhart.
Sewer pipe connection. J P Bates.
Sewing machine. H H Fefel.
Sewing machine bed plate. L Muther.
Sewing machine presser foot attachment. F B Almy.
Sewing machine trimmer. H H Fefel.
Sharpening machine, shears. C N Sly.
Shearing or clipping animals, machine for. C and H Barton.
Shears. C Thompson.
Sheet metal box. J D Ellis.
Shelf extension. H H McLenathan.
Signal boxes, means for testing electric. J F McInen.
Siphon. H Fleiner.
Spindle bearing. E J Carroll.
Spindle retainer. E J Carroll.
Spinning rings, manufacturing. M D Marcy.
Sprayer and nozzle, combined. F S North and A Raymond.
Stamp, canceling. M Peabody.
Stapp, rubber. G A Pickup.
Stand boiler for heating water. W E Duncan.
Station indicator. G W Robertson.
Steam engine. W N and C F Christopher.
Steam generator. W E Kelly.
Steam generator. C H and W A Preston.
Steam separator. W B Culver.
Stove. F Jones.
Stovepipe attachment. G A Kurtis.
Stove, portable. J Sinclair.
Stove, straw burning. E A Calahan.
Strainer for coffee pots, etc. T R Fischer.
Suspender web fastening. F A Burnham.
Switch detector bar. J H Boylett.
Telephone, magnetic. F H Brown.
Tennis apparatus, lawn. W B Hopkins.
Thermometer, cook stove. A P Knowles.
Tire, pneumatic wheel. E H Seddon.
Tobacco casing machine. D R Fraley.
Tobacco pipe. W Nax.
Tool, combination. E Cavanagh.
Toy pistol. C C Smith and T E Stone.
Trace fastener. F D Stafford.
Tramway, aerial. L Johnson.
Transplanter, tobacco. I Unger.
Truss. W S Rice.
Truss. J W Sneed.
Type setting apparatus 2. L K Johnson.
Type setting apparatus 1. L K Johnson and A A Low.
Type setting machines, perforating strips for. T B Caswell.
Type writing machine. O Cohn.
Type writing machine. H E Gillford.
Type writing machine. H L Wagner.
Umbrellas etc., holder for. A H Albertshardt.
Unloading apparatus. A McDougall.
Valve. J Frye.
Valve. T H Williams and N R Marvin.
Valve, automatic brake. A P Massey.
Valve, engineer's brake. L E Howard.
Vapor burner. P J Fitzgerald.
Vending machine. C P Young.
Washing machine. W F Day and J A Pierce.
Watch dial fastening. G E Hunter.
Watch, stem winding and setting. O O Martinell.
Water elevator and carrier. J H Hodges.
Water heater. A Pinney.
Wave motor. E Gerlach.
Welding or brazing mechanism, electric. G D Burton.
Wheels, apparatus for clamping peripheral

bands on. F P Pileghar.
Windmill. L W Noyes.
Windmill tank tower. L W Noyes.
Wind wheel. L W Noyes.
Wool drier. W White.

PATENTS GRANTED AUG. 7, '94.

Acid, phenylrosindulin sulfo. C Schraube and E Romig.
Addressing machines, stencil card for. C A Belknap.
Air brake. J D P Schenck.
Air brake, car. J F Voorhees.
Animal trap. C B Trumble.
Annunciator. P Weber.
Arms and hammers, shifting means for cocking. F A Hollenbeck.
Asphalt, etc., from petroleum, manufacture of. F X Byerley.
Autographic register. S Shoup.
Automatic gate. W Lagomassia.
Awning for vessels, portable. M Enright.
Axle box, car. J F Gallagher.
Axle making machine. C Mercader.
Axle pile. J B Baugh.
Bag holder. W D Harmon and E C Kelouge.
Band cutter and feeder. J W Regier.
Bed, folding. S Hawver.
Beer glass counter or game register. B Quietzsch and C R Glass.
Bell, sleigh. J Fisher.
Belt, conductor's money. J T Doherty.
Bicycle. A H Clark.
Bicycle saddle. A P Morrow.
Billiard time register. G J Wainwright.
Boiler furnace. W R Parks.
Boiler furnace, steam. G E Belmor.
Boiler furnace, steam. O D Orvis.
Boot or shoe sole cutting machine. H B Steele.
Boring machine. A Frazer.
Bottle filling apparatus. C W Clayton.
Bottle, month's, stopper or cover for. T B Birnbaum.
Bottle stopper. C B Schommechl.
Bottle stopper and vent combined. M L Bergman.
Bottle washer. F E Anderson.
Bottle wrapper. T F W Schmidt.
Box banding implement. J R Burkholder.
Boxes, etc., adjustable partition for packing. J V Coleman.
Brush and comb, combination. C D Hoagland.
Brush, fountain. T D Constant.
Brush, fountain cleansing. G W Park.
Bucket, elevating. T L Marvel.
Butter box lining. G W White.
Butter mold, adjustable. H S Maltby.
Button or stud, collar or cuff. T W Jones.
Cake machine. P D Hart n.
Camera shutter. J C Heggebin.
Canning apparatus, fruit. E M Williston.
Car buffer. W F Richards.
Car coupling. C L Beck.
Car coupling. J L Shough.
Car fender. A Kidd.
Car fender or guard, street or railway. E Kennitz.
Car fender, tram. W Dryden.
Car life saver. F M Chapman.
Cars, adjustable gate for street. L R Goodwin.
Carriages, rocker attachment for baby. F Walker.
Cartridge stop, rimless. M H Durst.
Casting machine, type. W H Welsh.
Cement mill. J A Albertson and J H Fisher.
Chain coupling. C F Noble.
Chain. R E Van Court.
Chain, rotary. A McMullan.
Clamp. A J Courtney.
Clipping machines, power transmitter for. J K Priest.
Clothes line reel. A S Fonda.
Coffee or tea pot, steam. G Laube.
Compasses. M Bradley.
Condenser, exhaust steam. W Webster.
Confections, machine for molding. J C Walder.
Coop, folding chicken. L Matthews.
Cork puller. M L White.
Corn silker. R P Scott.
Cotton gin. D Haynes.
Cross over tip, automatic. J M Phillips, J J Fleming and F Browning.
Cultivator, wheel. F C Stroker.
Curtain pole support, adjustable. G Barber.
Cut off, rain water. A Kroll.
Demijohn cradle. C B Dann.
Dice thrower. J H Nellis.
Dispatch tube system. H G Underwood.
Drawer extension. H C Smith.
Drying apparatus. B. W., and B S Foster.
Dye, azo. M Ulrich and J Bannmann.
Dye, blue. O Bally.
Dye, blue. R Knietzsch.
Dye, blue tetraxo, 2. C O Muller.
Dye, orange. C L Muller.
Dye, orange disazo. C L Muller.
Dye, safranin azo naphthol. P Julius.
Dye, substantive blue. C Schraube.
Dye, violet red. C Schraube and E Romig.
Eaves trough hanger. C Lamm.
Eaves trough hanger. S Silberstein.
Electric heater. J F Kester.
Electric light wires, rosette for. C N Hammond.
Electric machine, dynamo. R Eickemeyer.
Electric machine, dynamo. G Rennerfelt.
Electric machine, dynamo. W B Sayers.
Electric machine regulator, dynamo. T A Edison.
Electric motor. F C Whitmore.
Electric signal for steamboats. R H Gruschow.
Electric transformer. J J Wood.
Electrical motor. H B Porter.
Electrotherapeutic apparatus, circuit breaker for. L W Downes.

Elevating apparatus, hydraulic. G H Reynolds.
Engine cross head. A T Snodgrass.
Engine reversing gear. D H Grant and H Miller.
Envelope making and printing machine. C A Teal.
Exhibiting indicators, etc. Mechanism for. E Davies.
Feed water heater and purifier. W Webster.
Fence, hedge. E A Terhune.
Fence machine. G A Deutelbeck.
Fence post. H J Coe.
Fences, end post for wire. J M Phelps.
Fencing tool, wire. J M Barclay.
Filter. D C and J E Williamson.
Filter and connection with faucets or water supply. H Vellenoweth.
Fire engine, gas. D Keger.
Fire escape. E Dunning.
Fish hook. B S Martin.
Floor cloth. A Hagle.
Floor, fireproof. H B Price.
Flour bolting reel. S D Barr.
Flour packing bit. C B Donaldson.
Form, dress. D Brown.
Furnace bottom. A Beyer.
Game apparatus. R J Rolison.
Garment supporter and underwaist. C F Richmond.
Gas apparatus, steam supply and circulating system for water. O N Guldin.
Gas, coin freed apparatus for the automatic sale and delivery of. J Gow.
Gas lighting attachment. F M Brooks.
Globes of electric lights or lamps, guard for. J C Galster.
Grading streets or road beds, means for. J J McMahon.
Grater. J G Baker.
Guns, shifting means for cocking arms of breakdown. F A Hollenbeck.
Halter square or corner clasp. T N Martin.
Harness. D M Forsyth.
Harness or other strap. W W Pays.
Harrow. S H Merridith.
Heating systems, device for removing air from steam. L Hussey and E McAnn.
Heels, apparatus for forming spring. J P Bushfield.
Hoisting tackle. F E Young.
Horseback, vehicle. S F Robbins.
Horse blanket safety device. W D Adams.
Horse detacher. L M Bowers.
Horseshoe. O E Brown.
Horseshoe burnishing machine. W Mason.
Hot air furnace. H J Noyes.
Hub point band, vehicle. J Maris.
Ice hook. M B Wesson.
Insulated electric conductor, waterproof. D Macfarlan.
Insulating bolley wire support. F M Zimmerman.
Insulator for electric wires, supporting. L S Beardsley.
Ironing table. E Hayward.
Journal bearing. D I Lybe.
Jug. G W Spring and G W Printz.
Kettle. G W and J J Ciso, Jr.
Kneading machine. J Lee.
Ladder, extension step. R Dengel.
Ladder truck, extension. A Ruthenberg.
Lamp chimney rack. A E Snell.
Lamp, electric arc. W S Pendleton.
Lamp, electric arc. G G Stout.
Lamp, wickless. A Niemczik.
Lath machine. C F Darnell and L Koss.
Lifting jack, compound lever. N Weiler.
Linotype machine. O V Sigurdson.
Lock. J Roche.
Locomotive boiler. W F Richards.
Lubricator. P H and J G Knipper.
Massage, electric hand appliance for. A J Speare.
Match making machine. J C Donnelly.
Match splint assembling machine. J C Donnelly.
Measuring vessel. W F Keepers.
Metal working, electric. H Lemp and W S Moody.
Mining machine. H B Dierdorff.
Mining machine. B A Legg.
Mitten. A P Smith.
Molds for plaster casts, making. A W Monroe.
Molds, machine for dropping liquid material into. R S Murray and F W Eames.
Molding. G H Geyer.
Mortising machine. W H and W J Clark.
Mortising machines, protector for endless chain cutter. C S Mosley.
Mower, lawn. W G Vernon.
Music stand. G H McCah.
Musical instrument, strinned. J H Parker.
Nut lock. P W Dillon.
Nut lock. G Gibson.
Nut lock. T C Swofford.
Nut lock. J A Wells.
Nut locks, master key for. J C Brown.
Obtunder, thermo electric volatilizing. O B Bachman.
Oil burner. R Walten and T Rees.
Oil burner, fuel. R L Underwood.
Oil can. B H Chameroy.
Packing. N B Miller.
Packing, sheet. A P Cochrane.
Paper box. W J Walker.
Paper machine drier. F X Black.
Pen, hog. M C and Z S Randleman.
Photographic camera. J C Hegelein.
Pipe connection. W J Walker.
Piston rods to cross heads, device for securing. C G Turner.
Plants, apparatus for growing. W Oliver.
Pool register. G J Wainwright.
Preserving citrous fruits. D A Walker, Jr.
Pressure accumulator. C C Worthington.
Primary battery. W Walker, Jr., F R Wil-

kings and Lones.
Printing machine. C A Teal.
Printing press. W B Lawrence, (reissue).
Pulley block. W London.
Pulverizing mill, roller. E H Hurry.
Pump. J F Palmer.
Pump, electric. F W Merritt and A R Roe.
Pump, force. H Bender.
Puzzle. C B Macneal.
Puzzle. L L Porter.
Railway brake. R H Bulloch and J W Mallard.
Railway, conduit electric. R M Hunter.
Railway pole ratchet, electric. T J McTighe.
Railway rail joints, splice or support for. L H Woolley.
Railway signaling device. W Daves.
Railway switch, automatic. F W Wittkowski.
Railway work, motor suspension for. E W Rice, Jr.
Rake. C C Quigley.
Rasp. S D Hedge.
Receipt protector. A Steiner.
Reciprocating parts of machines way for. Z G Sholes.
Reeling device. J Hadfield.
Reflector for electric or other lamps. E Tilmann.
Reflector for lamps. E Tilmann.
Refrigerating machine. F B Hill.
Refrigerator car ventilator. G F Brown, Jr., and G P Hill.
Rendering lard by hot air, apparatus for. A Wild.
Revoluble screen. D E Phillips.
Ribbons, machine for reeling, measuring and severing type writer or other. R G Hopkins.
Rocking chair. J Kottmann.
Rowlock. J T Ish.
Rust from iron or steel, composition for removing. A Buecher.
Sad iron seam pressing attachment. N G Davis.
Safranin azo naphthol, dimethyl. P Julius.
Safranin azo naphthol lake. P Julius.
Safranin azo naphthol, soluble. P Julius.
Sash balance, electric. W C Hodgkins.
Sash fastener. J H Hottes.
Saw filing machine. W B Allen.
Saw guide. A M Pines.
Sawmill. C Edgar.
Scaffold, adjustable portable. T H Wimbush.
Scale, computing weighing. J W Cronan.
Scale, platform. M H Winslow.
Scales, check rod for platform. H Paddock.
Screw forging apparatus. C Fairbairn and M Wells.
Self waiting table. W R Cummings.
Separator frame and support. G O Draper.
Sewing carpet corners, mechanism for. F Ames.
Sewing machine. K S Klogel.
Sewing machine cabinet. T Kundtz.
Shades, holding mechanism for spring actuated. H H Sr., H H Jr., and W H Forsyth.
Shaft coupling. W H Harfield.
Shears. Z L Hayden.
Sheet delivering machine. R F Barnez and J G Smith.
Sheet metal perforation machine. D Henderson.
Shoe polishing machine. J Friedlander.
Show and advertising stand, revolving. G Fuchs.
Shutter opener, automatic. C Buerling.
Shuttle worker and fastener. G Andreen.
Shuttle threader. A Bonlay.
Signaling, submarine. L I Blake.
Skate blade and manufacturing same. T W Bryant.
Slate cleaner and drier. R B Berk.
Sole cutting machine feeding attachment. M E Knight.
Spike puller. P J Bjork.
Spinning machines, top roll saddle for. E Dixon.
Stage appliance. C B Jefferson.
Steam boiler. C E Parker.
Steam boiler, sectional. H M Norton.
Stoker, coal. W H Hannan.
Stone grinding or polishing machine. J Lavers.
Stopper puller. A W Butterfield.
Stove, heating. J S Harkins.
Switch. R B Yerby.
Switch safety device, point. L Dunn.
Telegraph instrument, printing. J H Rogers.
Telephone annunciator and call bell. F G Warrell.
Telephones, variable resistance medium for. W W Jacques.
Tent pole attachment. C H Giessen.
Thrashing machine band cutter and feeder. D C Ruth.
Time alarm. C O Major.
Time recorder, workman's. J Dey.
Tire, bicycle. J D Beebe.
Tire, pneumatic. H J Dougherty.
Tire, pneumatic bicycle. P Krumscheid.
Tire setting machine. J B West.
Tongue support. D Ward.
Trigger operating two locks alternately, single. F D Granger.
Trolley, electric car. G C Bonrdereaux.
Trolley wire circuit breaker. T J McTighe and S W Childs.
Trolley wire support. L Yakel.
Truck. F Peter.
Tunneling machine. R Stanley.
Type writer machines, machine for inking ribbons for. R G Hopkins.
Type writing machines. A T Vigneron.
Urinal. J Tucker.
Valve. F L Decarie.
Valve and mudler, pop safety. E B Knickle.
Valve, balanced. J A Bourgeat.
Valve, check 2. L Schutte.
Valve, engineer's. W C Whitacre.
Valve mechanism, engine. G I Rockwood.
Valve, slide. F H Morel.
Vehicle wheel. W Doig.
Vehicles, transverse seat for foot power. G O Draper.
Velocipede. J Desmond.
Velocipede, marine. H B Ogden.

Vessels, raising sunken. O A Balette.
Voltage battery, primary. W Walker, Jr., and F R Wilkins.
Wagon, dumping. A M and H V Chaffe.
Washing machine 2. J Hesselwood.
Water closet. M Garland.
Water closet valve, flush. J Liming.
Water or grease proof material. W B Howe.
Water purifying or liquor aging apparatus. R C Turner.
Welding machine, electric. H Lemp.
Wells, machinery for operating oil. W F Burr.
Wheel. A Sharp.
Wire splicing device. A Kile.
Wood cutting machine. D R Edwards.

PATENTS GRANTED AUG. 14, '94.

Ammonia purifier, anhydrous. R G Sneath.
Animal trap. J W Collins.
Animal trap. S D Morton.
Axle lubricator, car. J E Gill.
Baling press. A C Miller.
Barrel machine. F G Hoopes.
Barrel washer. A and B Danner.
Basin clamp. J W Biddle.
Bearing, roller. F Purdon, H E Walters, and W H Woodcock.
Beating engine for rags, etc. P Dillon.
Belt, electric. F A Brewster.
Belt fastener. J F Williams.
Bevel and square, combined. T Fahey.
Beveling shears for cardboard. A Krah.
Bicycle. H La Casse.
Bicycle. F Risinger.
Bicycle brake. E J Rea.
Bicycle seat guard. F F Martin and F V De Bem.
Bicycle sleigh attachment. J B Putrow.
Binder, temporary. W H Benson.
Blackboard. W T Slaughter.
Boats, etc., removable center and bilge keelson for metallic life. L H Raymond.
Boiler or steam generator. C D Mosher.
Bolster springs. W H Weber.
Boot or shoe. E A Thurston.
Boot, quarter. T Morgan.
Boring tool. C E Blue.
Bottle. W Von Bokern.
Bottle closing device. W W Dixon.
Brazing or smelting apparatus. M S Thompson.
Brick kiln. C F Kaul.
Brick machine. C H Horton.
Bridge, suspension. D B McHenry.
Brush. J L Shute.
Brush, fountain or hydraulic. W H Miller.
Bucket cover, sup. D S Sperry and G R Hannum.
Buckle. G M Aylsworth.
Buckle. D F Stayman.
Building construction. E R Storm.
Bumping post. A Ewaldt.
Burning city refuse. E L Ransome.
Bus bar switch for central stations. A B Herick.
Button or stud, cuff. C C Champenois.
Calipers and dividers. R A Sadler.
Cane, walking. M Forst.
Car brake operating mechanism. T F Kenney.
Car coupling. S G Wilber.
Car, dumping. R C Davison.
Car elevator, railway. G T McLanethlin, M W E Brunkhorst, and M B McLanethlin.
Car fender. J T Duff.
Car fender. J F McDonough.
Car jack. W Jewell.
Car, railway. C A Smith.
Cars, switch for electric railway. T A Remsen.
Carding engines, means for fastening card clothing to flats of. W Senior, I Wood, E Hughes, and W Hemmingway.
Carding machine ring doffer cylinder. J K Proctor.
Carpet rag looper. J Gerard.
Casting, means for. W H Drake and J C Green.
Check perforator. S Windecker.
Chromium, making green oxid of. F L Slocum.
Cigar bunch machine. A Schwehr.
Circuit breaker, automatic. A C Carles.
Clothes pounder. N D Lewis.
Clutch, friction. W D Ewart.
Clutch, reciprocating. L Porter.
Coal screen, revolving. G W Cross.
Conduit cleaning device. C O Ehlert.
Confectionery machine. T Robertson.
Cooking utensil. J B Skyeen.
Cotton, beater for use in machines for opening. J C Potter.
Cotton, feeding mechanism for machinery for opening and preparing. J C Potter.
Crane or derrick. J N Sturm.
Crank, extension. T F Bourne.
Cultivator. J Porteous.
Current motor, alternate. W Stanley, Jr.
Cylinder lock. J T Pedersen.
Decorating machine. J H Boeken.
Dental mouth mirror. A E Gray.
Dish cleaner. R A Sanderson and J C Earl.
Dish cleaner. J N Tinklepaugh.
Dish cleaner. A A Wright.
Door hanger. W A Hance.
Door hanger. T C Prouty.
Dough dividing machine. F H Van Houten.
Drain testing apparatus. T Grace.
Dry plates, apparatus for exposing, developing and washing. L Nievsky.
Drying kiln. L Moore.
Dye, black disazo. C Bulow.
Dye, blue. E Elsaesser.
Dye, blue, 2. B Heymann.
Electric circuits, battery changer for. C Bernhardt.
Electric heater. C H Newbury.
Electric machine or motor, dynamo. A B See and W L Tyler.
Electric machinery, regulation of dynamo. E M Bentley.
Electric motor. W L Silvey.
Electric motor controller. J H Jenkins.
Electric motor controller. W B Potter.
Electric search light. E R Knowles.
Electrical conductor. E D McCracken.
Electrical distribution, system of. T A Ed-

son.
Electromagnetic motor. N Tesla.
Fabrics, compound for renovating. C P Andersen.
Feed water heater. W L Harvey.
Fence. W M Grisham.
Fence machine, wire. H H Van Ormer.
Fence pickets, machine for wiring. J A Salzman.
Fence wire stretcher. B Doud.
Fertilizer distributor. D M Averitt.
Filter, water. B F Field.
Firearm recoil check. B Blake.
Fire escape. C M Fowler.
Fire escape. F T Stacy.
Fire extinguisher, portable chemical. I L Carr.
Fire tower. W F Anstin.
Fishing reel. F W Moog.
Floors or other surfaces, machine for the manufacture of coverings for. A S Oetzmann.
Flue register. A J Cohen.
Fly gate for attachment to screen, etc. E Hayden.
Fruit box. G C Ricards.
Fruit carrier. E E Wade.
Fruit carrier. I B Wollard.
Fruit holder. W McAnsland.
Fuel feeding device. J Davies.
Fuel, garbage and sawdust. J D Oliguy.
Furnace. F W Ingram and E E Carr.
Furnace. D J McKenzie and W Martin.
Furnace fuel feeding device. J W Wetmore.
Furnace grate bar. G H Randolph.
Furnaces, preparing charges for and charging metallurgical. W B Hughes.
Game apparatus. C E Wheeland.
Garment clamp, 2. S Schwarz.
Gas jet shade attachment. V I Copland.
Gas lighting device. C W Muchall.
Gas making apparatus. E R Ellsworth.
Gases, method of and apparatus for detecting and measuring inflammable. B C Tilghman, Jr.
Globe holder. R J Ashworth.
Gold and silver from ores, extracting. J C Montgomerie, 2.
Gold or silver ores, treating. E D Kendall.
Gore cutting machine. N J Kendall.
Grain binder. H F Crandall.
Grease trap. E H Donahoe.
Grinding wheel. F W Beckert.
Gun carriage recoil press. A Noble and R T Brankston.
Gutter leader and stainer. W H Hawkins.
Hammer, claw. W H and P A Burgess.
Hammer, drop. W A Cornbrooks.
Hand bag, satchel or valise. M Lowy.
Harvester, corn. W K Liggett.
Hay press. S Etchison.
Hay rake and shocker. J T Hough.
Headers or tubes, machine for spreading ends of. C P Higgins.
Heater. Z H Boole.
Heater. M Ready.
Heating furnace. L P D Yost.
Hinge pin and making same, blind. C E Hart.
Hinge, spring. M Redlinger.
Hoist. D E Rowland.
Hoisting and conveying apparatus. T F Moore.
Hoisting apparatus. J V Beckman.
Hoisting apparatus. C C Kinsman.
Hoof trimming and paring device. D M Sntton.
Hook and eye. H Davidson.
Hop picking machine. E D Mills and L Emelin.
Horse chin check. T Raymond.
Horseshoe. J E James.
Horseshoe machine. J A Burden.
Hose coupling. A Hitt.
Hot air furnace. M Rudert.
Induction coil. C L Jaeger.
Injector. W R Park.
Injector burner. W B Wright.
Insect guard for doors. H L Long.
Insulating turnbuckle. H H Luscomb.
Insulating turnbuckle. L McCarthy.
Insulator. G H Winslow.
Irrigator, grave mound or flower bed. R R Dunn.
Kiln for firing pottery, etc. L Lawton.
Lace fastener. O P and G O Elterich.
Ladder, extensible step. W A Selzer.
Ladder, fire. W E Walker.
Ladder, roofing. E A Austin.
Lamp. J Geiser.
Lamp, arc. R Drysdale.
Lamp burner. J Kampf.
Lamp carrier for miners' caps. C H Hobson.
Lamp, electric arc. O H Swoboda.
Lamp heater attachment. A H Cowan.
Lamp post, arc. R R Bowker.
Land roller. J F Youtz.
Lantern slide mat. P S Benedict.
Lasting machine, 4. N Lombard.
Lasting machine. E Patten.
Latch. A Iske.
Letter box. H L Johnson.
Lobster trap. A P Lewis.
Lock, 2. F W Mix.
Locking box. A R Bingham.
Log rolling hook. G S Kahne and O Stenerson.
Loom jacquard mechanism. B H Gledhill.
Loom pattern mechanism. R Beaumont and G Washington.
Loom shuttle picking mechanism. M T Bartelt, C Golle and G Stein.
Loom temple. F A Garney.
Lubricator. W A Downes.
Lumber binder. T A Barber.
Lunch box. E Haskell.
Meat tenderer. D J Hake.
Mechanical movement. T Beach.
Metal articles, apparatus for forming, 2. J Robertson.
Metal articles, forming. J Robertson.
Metal articles, method of and apparatus for forming 2. J Robertson.
Metal tubes, rods, etc., apparatus for the manufacture of, 2. J Robertson.
Molding machine. W B Sterritt.
Mole trap. H D Nichols.
Mortar mill. S B Ladd.
Motor. S C Pettegrew.
Motor generators, compounding. J Burke.

Motor regulator. J F Sheahan.
Mower. J Sheahan.
Music or book leaf holder. H C Ward.
Mustache curler. W S Cooper.
Needle case. J J Morrison.
Nail lock. B F Sweet.
Oils, etc., and making same, solution of sweet carbanid in. A Sommer.
Oils, etc., solution of sweet carbanids in. A Sommer.
Ore concentrating and gold saving apparatus. C M Fitch.
Ore concentrator, 2. G H Hooper.
Oven door. F H Van Houten.
Package and cash carrier, belt line. A N Woodard.
Packing case, hand. S A Durfee.
Packing, steam. H W Johns.
Paper fastener. R M Pancoast.
Paper holder and cutter, roll. C H Hapgood.
Paper making machines, section box mechanism for. J W and J G Bedale.
Parasol for children's carriages. G P Steinbach.
Parcel and cash carrier apparatus, tilting. A N Woodard.
Peeling potatoes, etc., machine for. E Jaeger.
Pencil sharpener, slate. C W and W H Ogle.
Pipe hanger. W McIlvrid.
Pipe joint, flexible. A J Sargent.
Pipe joint reducing apparatus. G O Riman.
Planter, corn. C O Weltzen.
Planter, seed. A Wade.
Pneumatic controller 2. E H Dewson, Jr.
Pole tip, vehicle. E Bailey.
Power distribution and regulation, system of. J W Gibbons.
Power transmitting device. W Schofield.
Printing wads on both sides, machine for. C B Richards.
Propeller. D H Welch and J L Lovell.
Propeller, screw. S G Hinds.
Propelling mechanism, boat. A H Bacon.
Pulley, grip. A E Brown.
Pulp, press for making spools from fibrous. E Hubbard.
Punching and cutting tool. D G Urquhart.
Punching machine. R Walsh.
Punching machine, metal. J B McLane.
Race course. W Hallock.
Railway frog. B Blake.
Railway frog. W Rowlands.
Railway gate automatic. J Baade.
Railway signaling device. W H Allen.
Railway switch. J F Barrett.
Railway switch. D McPherson.
Railway switch. J F Ober.
Railway switches, device for operating street. C E R Christensen.
Railway system, electric 2. T B and H Wilcox.
Railway systems, electromagnetic contact making device for electric. T B and H Wilcox.
Railway tie, metallic 2. E L Taylor.
Raisin grader. J Porteous.
Ratchet wrench, adjustable. C H Bernheim.
Refuse, means for treating city. E L Ransome.
Resilometer. C E Hadley.
Rheostat. A B Herrick.
Ring gage, finger. E Gruebel.
Riveting machine 2. C P Higgins.
Road roller, steam. E T Wright.
Rolling machine, metal. G L Hart.
Sad iron. W Blankner.
Sample case. W R Parison.
Sash fastener. J H Foote.
Sash holder. T Chope.
Saw setting tool. J A Minger.
Sawing machine, metal. C C Newton.
Sawing machine portable. J A Morrell.
Scaffold. J Jones.
Scraper operating apparatus. H G Butler.
Seal 3. E J Brooks.
Seaming sheet metal tubes, machine for lap. F B Lotze.
Sewing machine 2. J Ott.
Sewing machine, shoe 2. F A Mills.
Sewing machine tension device, shoe. F A Mills.
Sewing machines, loop forming mechanism for shoe. F A Mills.
Sewing machines, wax thread heating device for. F A Mills.
Sewing machines, waxing and heating device for shoe. F A Mills.
Sewing machines, work supporting and feeding device for shoe. F A Mills.
Shade attachment, window. G B N Dow.
Shaft hanger. W Diebel.
Shaft hanger. E A Hill.
Shears. E Bailey.
Sheet feeder. G R Clarke.
Shingle package. M J Carkeek.
Shoe polisher. M Christenson.
Shutter, iris diaphragm. P Rudolph and O Nather.
Signal operating rods, adjusting device for. G A Weber.
Signaling device, automatic electric. E A Hermann.
Slate frame. J H Rudolph.
Slicing machine, vegetable. A C Cook.
Smoke consuming furnace. H Engel.
Snap switch, double throw. E M Hewlett.
Spark arrester. R F Dougherty.
Sprocket wheel, combination. G W Kortright.
Starch containing solutions for use in brewing, distilling, etc., making. S Pratt.
Starching machine. C O White.
Station indicator. A Lambert.
Stave machine. N Burr.
Steam condensing apparatus. W Webster.
Sterilizing milk, etc. G Popp and J H Becker.
Storage battery, electrical. B C Van Emou.
Stove, foot. A Kindley.
Stove, sheet metal. C T McCarroll.
Straw stacker, pneumatic. N Newsom.
Street sweeper. J H Keyuolds.
Structure, supporting. H Peterson.
Surveying instrument. W Hinton.
Tack, thumb. A A Woodward.

Tank for oil. H Raymond.
Telegraphic transmitter. F F H.
Telephone switch. H T J Jenson.
Telephone transmitter and resistance ary.
ing material therefor. F R Odum.
Telephonic system. H A Ouse.
Thill coupling and anti ratchet, combined. J B Nowell.
Thrashing machine band cutter and feeder. J Hovey.
Tile or brick cutting machine. J Bensing.
Timepiece winding mechanism. H Schumacher.
Time recorder electric. H T J Jenson.
Tobacco cutter. G K Walker.
Top, spinning. C Diem.
Transplanter, tree. J Santmier.
Tricycle, figure. C V Best.
Trolley wheel and support. D R Thomas.
Trolley wire switch. J M Anderson.
Trotting spoon. H J Thayer.
Truck, radial car. W Robinson.
Tug, shaft. E Logan.
Tunnel. A S Dandridge.
Twine making machines, automatic feeder for. G A Lowry.
Type distributing machine. F Prannegger.
Type holder. J C Corbett.
Type setting machine. F Prannegger.
Type writer cabinet. C Morrison.
Type writer word register. J E Withrow.
Type writing machine. C W Walker.
Umbrella sticks, machine for slotting. M Gans.
Valve for steam engines, vacuum or hand actuated by pass. J M Searle.
Valve for water gauges, automatic safety. G S Neely.
Valve gear, steam engine. W F Brown.
Velocipede brake. G F Hall.
Vending apparatus, coin controlled. J F Sawyer and J L Purves.
Vencer press. C E Francis.
Violin fingerboard. W W Waring.
Vise, pipe. J Lane.
Wagon shoveling board. C W Needles.
Wall cleaning compound. J C Hochhaus.
Wall tie. J Prescott.
Washbench. D B Washburn.
Water closet. J H Stevens, Jr.
Water closet. F R Treiber.
Water closet seat attachment. J H Stevens, Jr.
Water meter. J E A Bel.
Wave motor. J Singer and J C Wood.
Weather strip. D E Vanvactor.
Well attachment, atesian. F Cavallaro.
Wheel. W E Meyer, C M Young and A V Boyce.
Whiffletree. G H Talbot.
Whiffletree hook. W Dewey.
Windlass. J F Barrett.
Windmill. C H Page t.
Window screen. B R Parker and C A Freeman.
Wire stretcher. L Roadhouse.
Wire stretching spool carrier. T P Wilhams.
Woven fabric. H Hardwick.
Wrench. L Coes.

PATENTS GRANTED AUG 21, '94.

Advertising device. E Walker.
Aerating and carbonating water, apparatus. T Crauey.
Air brake. C R James.
Antispattering guard. C Swayze.
Apothecary's graduate. T E Ogram.
Atomizer. A M Shurtleff.
Awning. E V Gaudin.
Axle box for wheels. F C W Rorer.
Axle, vehicle. W L Massengale.
Bag lock. W Roemer.
Banjo attachment. W H Needham.
Barber's chair. W G Hullhorst.
Barrel heads, etc., machine for packing. N Peters and M Matthey.
Battery plate separator. W L Silvey.
Bearing, roller and ball. G L Cline.
Bearing, universal adjustable. E J Muller.
Beating engine. J P Cornett.
Bed, folding. J D Morarity.
Bedstead, metallic. J B Ryan.
Beer, ale, porter, etc., process of and apparatus for the manufacture of. L Wagner, J Marr and H Campbell.
Bevel. W H Coombs.
Bicycle adjusting device. A Perkins.
Bicycle bell clamp. E D Rockwell.
Bicycle wheel brake. E D Rockwell.
Bicycles, back support tor. R A Boyd.
Billiard cue. L K Sprague and F W Bajus.
Boiler setting. A Worthington.
Boilers of locomotive type, fire box for steam. W Malan.
Book holder for reading stands. F J Ande, on and W M Erick.
Boot or shoe. A A Collins.
Boring bit. E C Phillips.
Bottle sealing device. J S Detrick.
Bottle stopper. C O Niendorf.
Box fastener. D E J Wellhoener.
Brick mold. D J C Arnold.
Burial casket. M M Hoffmann.
Can labeling machine. F Tardif and W Wethered.
Cans, liquid emptying device for. A F Chable.
Car controller, electric. M B Monroe.
Car coupling. S Pennington.
Car coupling. J W Tolar and B D Langston.
Car coupling hook blanks, making. H W Wyman and L F Gordon.
Car coupling hooks, die for forging. H W Wyman and L F Gordon.
Car, electric railway. J C Henry.
Car fender. J Rmirell.
Car fender. R Thompson.
Car fender, street. T C Rice.
Car fender, trolley or other. E Bockman and J E Hagan.
Car sanding device. H F Rooney.
Cars, draft rigging for platform. C C Borton.
Carriage jack. O W Bowen.
Carriage spring. C A Behlen.
Cart operating device, tip. C P McClanathan.
Case. H Peake.

Cash register and indicator. A Pfaff.
Cash register and indicator. C W Shibley.
Cash register, indicator and check printer.
C W Weiss.
Ceiling, etc., sheet metal paneling for. F G Caldwell.
Chain clasp, watch. T Mason.
Chain links, machine for coupling drive. N B Fassett.
Chain, machine for making predetermined lengths of. C F Smith.
Chamfering machine. T Craney.
Check rein attachment. G W Taylor.
Cigar tip cutter and advertising device, combined. C H Gould.
Circuit controller. E J McEvoy.
Circuits, safety switch for high potential. S Harris.
Clothes drier. H R Sheets.
Clutch. C A Weller.
Coal scuttle. J W Krieger.
Coffin handle. C F Mosman.
Coin controlled machine. H A Manley.
Combination lock. J H Wittington.
Commutator cylinder. A J Shaw.
Commutator for dynamo electric machines. G F Card.
Conduit for electrical conductors, underground. J F Cummings.
Conveyer. C S Schenck.
Cork board, method of and apparatus for manufacturing 2. T A Weber.
Corset busk stay. H G Stiebel, Jr.
Cotton openers, evening mechanism for. J C Potter.
Crane. F B Griffith.
Cultivator. W W Cox.
Curtain stretcher rod and guide attachment hook, car. A Schulte.
Cuspidor, stationary. O W Smith.
Decorticating china glass, etc., machine for. J A Lacote.
Dental vulcanizer. J H Beebee.
Derrick, hay elevating. D Ogilvie.
Distillation, apparatus for continuous. R A Chesebrough.
Door opener and closer. G Rischmuller.
Door operating device. G Rischmuller.
Draft equalizer. N H Roberts.
Dynamo regulator, automatic. H D Symmes.
Edger, bevel. S H Randall.
Egg case, folding. O W McNeill.
Elastic washer. W Heiser.
Electric currents into alternating currents, apparatus for transforming continuous. F S Schneider.
Electric heater. T W Young.
Electric light support. W H Connell.
Electric meter. C D Raab.
Electric wire coupling. C K Hall and W B Liliard.
Electrical distribution, system of. G Westinghouse, Jr.
Electrical testing switch. H Smith.
Electricity for light and power purposes, apparatus for supplying. M M Kohn.
Electrodes, producing. D G Fitz Gerald.
Electrolytic purposes, tank or cell for. F E and A S Elmore.
Electrotyping, machine for making wax forms for. C M Letz.
Elevator safety appliance. M C Fullenlove.
Elevators, swivel spout for. D A Robinson.
End gate, wagon. F F Varing.
Exercising machine. R H Bath.
Explosive compound. G J Buechert.
Eyeglasses. G W Bennum.
Farm gate. A Gano.
Fence, farm. G Russell.
Fence ratchet, wire. J E Betz.
Fertilizers, making. C Weigelt.
Fiber from agaves, etc., machine for extracting. E Samper.
Filter. H Eisner.
Filter. D Jones and C Test.
Filter. G W Rafter.
Filtering apparatus. W Oliphant.
Fire alarm system. J W White.
Fishing jig. J E Bacon.
Folding box. G H Savacool.
Fumigator. E G Horne.
Furniture cover holding device. P J Mayent.
Game apparatus. C F Burtis.
Game or puzzle, combination. W T Carter.
Garment pattern, adjustable. H M Lambright.
Garment supporter. W A Stephen.
Gas burner safety attachment. H Eschweiler.
Gas meter, dry. E McGrady.
Glass for skylights, etc. J H Croskey and J Locke.
Glass structure. E W Cunningham.
Glove fastener. F F Raymond, 2d.
Granulating mill. T A Weber.
Grate bar. F W Schnautz.
Grinder, knife or sickle. H C Deane.
Gun, folding magazine. A Burgess.
Gun, magazine. J M Browning.
Harvester, corn. W K Liggett.
Harvester sheaf carrier and dumper. S D Locke, Jr.
Hay press. J A Stokeley.
Hod. A G Brandt and F M Spencer.
Hoisting and conveying apparatus, bucket. T F Moore.
Horse checking device. J Davie.
Horses from vehicles in motion, safety device for detaching. I Briggs.
Hydrocarbon motor. J H Knight.
Hydrometer. H S Keating.
Insulator. C N Hammond.
Iron, carburizing. J Meyer.
Journal bearing, antifriction. T Voegtl.
Knob attachment. C F Doebler.
Knob attachment. H M Newington.
Lace clipping machine. C H Wilcox and J Range.
Ladder, extension. M B Monroe.
Lamp, electric arc. R H Jahr.
Lamp holder, electric. F O Farwell.
Lamp shade. H Hohenstein.
Latch and lock combined. N H Colwell.
Laundry iron, box. C W Potter and J C Hewitt.
Leather splitting machine. S H Randall.
Locomotive boiler. E C Jordon.
Looms, jacquard apparatus for. T Halton.
Lumber gage. H H Britt.
Lung power tester and developer. J R Hanlon.
Magazine camera. A A Foiret.
Magazine camera. J F Parsons.
Mailing tube. G P McIntyre.
Mantel, sheet metal. J Graves.
Marble, manufacture of artificial. L Nathan.
Measuring device, cloth. W E Clarke.
Measuring tank. O James.
Metal sheets, apparatus for coating. G Russell.
Milking machines, teat cup for. A Shiels.
Model, folding or collapsible. F C Krantz.
Motor generator. J C Henry.
Needle threader. C S Goldman.
Net, landing. A Holmes.
Nipple holder. J Canney.
Non conducting handle. F O Farwell.
Nut lock. W M Duane and E A Peck.
Nut lock. D M Fulton.
Nut lock. B Porter.
Nut lock, rail brace and tie plate, combined. C W and O P Page.
Organ sheath, mouth. H C Boetticher.
Packing, piston rod 2. J Lister.
Paper cases for enclosing cigarettes, apparatus for making. R Dalton and H H Wills.
Paving roller, heated. W E Dennison.
Pencil lead. J A Cook.
Phonograph return carriage. H Hoeschen.
Phonographs, coin released actuating mechanism for. G T Waldron.
Phonograph mounts, device for cutting cards with beveled edges for. B McHugh.
Piano fortes, keyboard attachment for. P Soblik.
Pick 3. J Z Coblens.
Pitchforks, manufacture of. F S Kretsinger.
Planter, cotton. J Harper and F Clingfast.
Plow, double stock. J T Barber.
Pole attachment, vehicle. F Queiszer.
Pole, carriage. N L Holmes.
Pressure brake mechanism, automatic fluid. H Guels.
Pressure regulator. F V Matton.
Purse frame. S Nathan.
Radiator. L H Prentice and G Mehring.
Radiator coupling. T C Joy.
Railway, cable. N D Polites.
Railway motor, street. W H H Stineman.
Railway signal, electrical. L Dornberger.
Railway supply system. J F Cummings.
Railway supply system, electric. M Wheelless.
Railway switch. S H Crampton.
Railway switch, automatically operated. G W Carpenter.
Railway tie plate. D Servis.
Railway track sander. W G Middleton.
Railways, electric danger signal for. A B Murray.
Razor strop. F R and O Kampfe.
Reclining chair. A Hackman.
Regenerative furnace. W Swindell.
Retort, inclined. K M Mitchell.
Retorts, bench for inclined. K M Mitchell.
Retorts, device for removing can holding crates from. W W Abbott and J Green.
Revolver, double barreled. C von Pecker.
Rock drill. W H Dixon.
Rolling mill coupling device. S M Gass.
Rotary engine. K Billing.
Rotary steam engine. R N Ink.
Safe. G J H Goehler.
Sash fastener. U H Balcom.
Sash fastener. L C Miller.
Sash lift and ventilator. T A Blanchard.
Saw mill carriages, automatic offset mechanism for. C Elvidge.
Screw driver, anger and countersink, combination. A McDougall.
Scrubbing machine. A An.
Seal. E J Brooks.
Seal, snap. E J Brooks.
Seats, protector for exposed. G H S Farrant.
Sewing machine attachment. W S Soule.
Sewing machine, shoe. E E Bean.
Sewing machine shuttle. C E Wilkinson.
Shade adjuster, window. E W Smith and E H Miller.
Shade fixture, window. W T Estberg.
Sheet metal vessels, attaching handles to. G W Knapp.
Shoe. L G Kregel.
Sickle sections, method of and machine for serrating. M Gindorff.
Sifter. C P Eichler.
Sign. E Bohm.
Sofa and bed, combined. B T Lawton.
Spinning and doubling cops of cotton. T and J Seed.
Spring motor. J F Seiberling.
Sprocket wheel. W A Leggo, Jr.
Stave jointing machine. I A Kerr.
Steam boiler, sectional. A Worthington.
Steam generator section. T L and T J Sturtevant.
Street sweeper. C Fisher.
Street sweeper. W L Tobey.
Stretcher. S N Hiser.
Striking bag. C A Forsberg.
Stump extractor. A J Smith.
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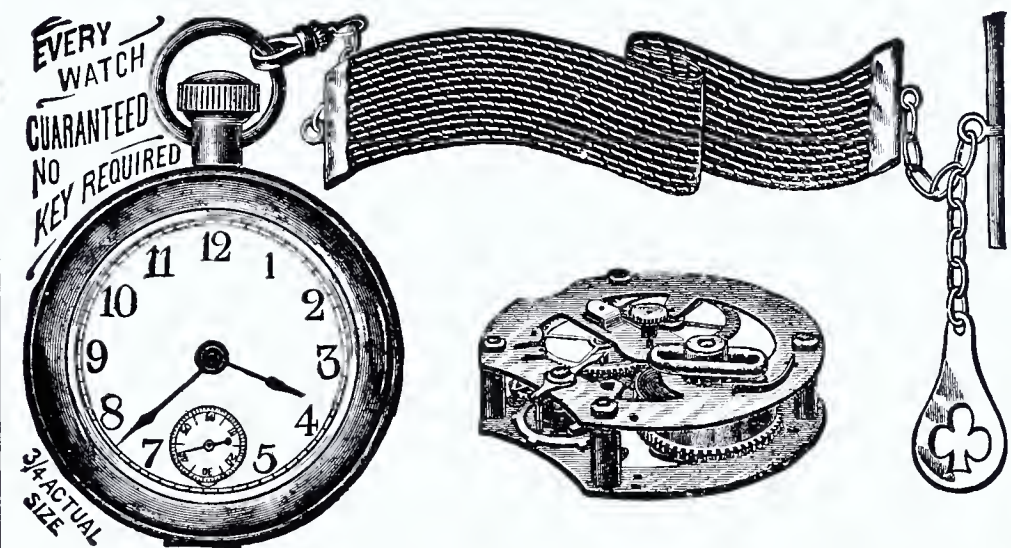
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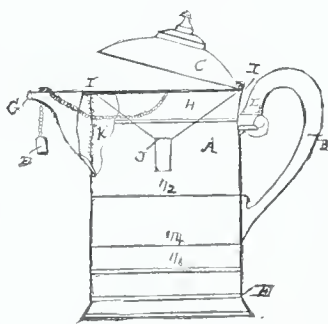
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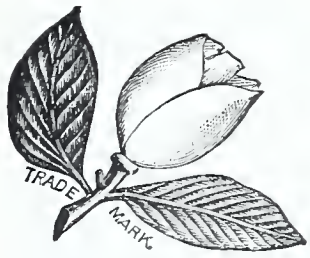
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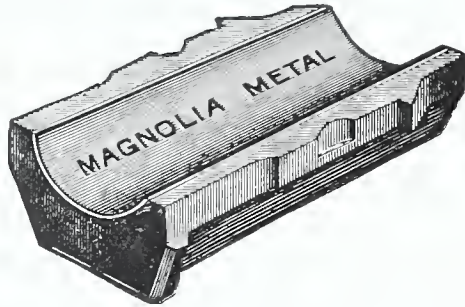
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WASHINGTON, D. C., OCTOBER, 1894.

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THE POWER OF NIAGARA.

Interesting Data Regarding the Great Work of the Niagara Falls Power Company.

Through the kindness of the Van Denbergh Laboratory of Chemical Industry, Buffalo, THE INVENTIVE AGE is enabled to present herewith the most comprehensive illustration of the great work of obtaining and utilizing power from the falls of Niagara that has yet been published.

For the data concerning Niagara Falls, we are in-

of the river would be continued at its present rate for 100 years—if the lakes could be gradually drained. Such is the never failing reservoir from which the Niagara Falls Power Company proposes to draw its supply.

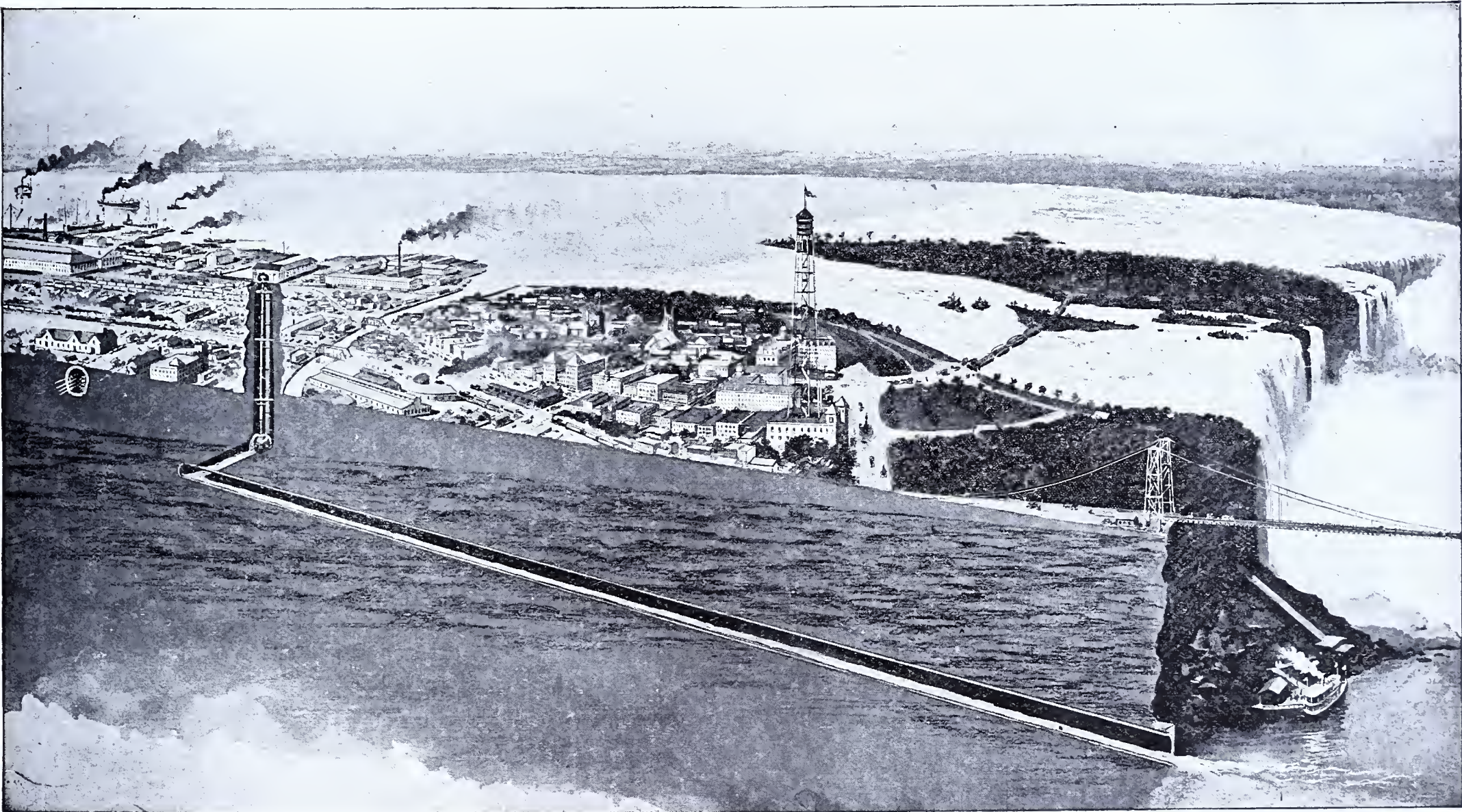
The Company has acquired 1600 acres of land stretching to a point five miles easterly and three miles northerly from the Falls. Of this 1071 acres are intended to be devoted to mill-sites for manufacturing.

The Niagara Development Company—a sub-Company to provide homes for the operatives has purchased 340 acres of land, 83 acres of which are al-

penstocks to the turbines and is discharged into a channel at the bottom of the wheel-pit, from which it flows into the main tunnel and is returned to Niagara River at the portal just below the upper suspension bridge.

The wheel-pit (cut into the solid rock) is 178 feet deep, 21 feet wide and at present is 140 feet long. When it is continued to its full length as planned, it will provide for ten inlets and be about 400 feet long.

The work of construction was commenced by Rogers & Clement, of New York, the contractors, October 4, 1890. The tunnel is lined throughout with



BIRDS-EYE VIEW OF NIAGARA FALLS, SHOWING THE WORK OF THE CATARACT CONSTRUCTION COMPANY.

debted to William A. Brackenridge, resident engineer, Cataract Construction Company:

The water surface of the great lakes, (excepting Lake Ontario) is 84,000 square miles. Water-shed of same, 240,000 square miles—more than twice the area of Great Britain and Ireland. Length of shoreline, 5,000 miles. Volume of water, 6000 cubic miles—of which Lake Superior contains a little less than one half. Rate of out-flow at Buffalo, 217,000 to 275,000 cubic feet per second. Niagara Falls is 23 miles below Lake Erie and 14½ miles above Lake Ontario. Fall, 165 feet—depth of water just below Falls, 189 feet (plus)

The volume of water in the lakes is such that it has been estimated that, even if no rain fell, the flow

ready improved by houses, stores, a school-house, streets, water, and a double system of sewers leading to the sewage disposal works.

Total water power of the Falls, 7,000,000 horsepower.

Amount to be used, 125,000 horse-power.

The canal: "The main canal is protected against floating ice by having its entrance directed downstream, and by a floating boom fastened to iron piers at its mouth.

The canal is 1,300 feet long, 100 to 130 feet wide, and the depth of water will average 12 feet. The greatest velocity of flow in the canal will be 4.17 feet per second, when a sufficient amount is being fed to the turbines to produce 100,000 horse-power. From this inlet canal the water is led through steel

vitrified brick—a total of over 13,000,000 being used in the construction.

The mills of the Niagara Falls Paper Company (the largest in the world) are being operated by hydraulic power from the inlet, and a concrete subway five feet six inches by three feet ten inches is ready for the wires, which are to supply 6,000 electrical horse-power to the Pittsburgh Reduction Works, and thence by poles to Buffalo.

Three turbines of 5,000 horse-power each are already in position, and the dynamos are nearly ready to be placed.

The tunnel is 7,250 feet long, 14 to 18 feet wide and 21 feet high. The grade is 36 feet to the mile, and the tunnel passes 200 feet under the city of Niagara Falls—as indicated in the illustration.

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WASHINGTON, D. C., OCTOBER, 1894.

FURTHER tests have demonstrated the impracticability of the Dowe bullet-proof coat. In the first place the great weight would make the soldier not only clumsy, but fatigued, and in the second place it has been demonstrated that the material is not entirely bullet-proof.

THAT great monopoly, the Standard Oil Trust, having monopolized the oil trade in America recently negotiated with the Russian authorities looking to a division of the world's supply of oil. It is now reported that the Russian Minister of Finance has arbitrarily ordered all negotiations off.

FROM the latest figures obtainable it is discovered that the average freight rate in the United States is less than in any other country. The average per ton per mile in Europe is 2.02 cents, while in the United States it is but 1.22 cents, Switzerland presents the highest rate, 3.36, followed by Norway with a rate of 3 cents.

THE thirteenth annual meeting of the American Street Railway Association at Atlanta, Ga., October 17-20, promises to be the most interesting convention the Association has ever held. A large number of manufacturers and dealers in street car appliances will make an exhibit in Machinery Hall and a great deal of interest is being taken in the enterprise.

AT present prices, under the new reduced tariff, it is possible for England made steel rails to be laid down at Gulf points for \$25. As this is the present price of steel rails in Chicago and the freight rates about \$5 per ton to the seaboard, the Iron Age argues that "something must give way," if the southern rail trade is to be retained by American manufacturers. Lower wages and smaller profits is the logical sequence to the new tariff schedule.

THE government revenues are now largely in excess of the expenditures and what is true of the government is also, for the first time in many months, true of thousands of manufacturing concerns and business enterprises. There are unmistakable signs of improved business activity and it is believed that no matter what the result of the elections in November may be the "hard times" cry will have lost its terror before the holidays.

THE recent meeting of the Southern Development Association was productive of at least one act possessing more than passing merit. A resolution was passed endorsing the bill, pending in Congress, looking to the erection of a building in Washington for a permanent exhibition of all the states of the union. It is a well known fact that a nation is judged largely by the character of its Capital, and that city should therefore, not only present the highest type of civilization; should not only be the art,

music and literary center, but here should be exhibited the result of the most enlightened inventive genius and mechanical and industrial enterprise.

ARRANGEMENTS have been completed with the Correspondence School of Mechanics at Scranton, Pa., to furnish instruction to members of the National Association of Stationary Engineers in all the mathematics necessary for an engineer, *i. e.*, complete arithmetic, the handling of formulæ, logarithms, calculation of areas, etc., for \$3. This is a special course prepared for the N. A. S. E., only, brought about through the efforts of a committee appointed by the Association about a year ago.

"THE trade prospects are a little brighter," is the essence of the numerous replies to a question put by the Tradesman to a large number of southern manufacturers in relation to fall business. The enforced and voluntary idleness of hundreds of thousands of laboring men during the greater portion of the season finds them on the threshold of winter long on hope and short in means. In his hopefulness for the future the laborer is no less concerned than the owner of idle machinery.

THE western farmer who is casting around for a reason for the continued low price of wheat will find it in the fact that the surplus, according to the most conservative estimates is 75,000,000 bushels more than the world's markets demand. No matter what the political tramp in his perambulations about the country precincts this fall may say—no matter what reasoning he may indulge in—the farmer has but to contemplate the fact that more wheat is being raised than the human beings of the world consume. In this fact lies the cause of 35 to 50 cent wheat in the great wheat producing states of the northwest.

THE thoroughness of the investigation of the management of the Northern Pacific railway—ordered by Judge Jenkins on petition of President Ives—is only excelled by the sweeping vindication of Thomas F. Oakes, manager and receiver of the company, in the report recently filed in Milwaukee by Master in Chancery A. L. Carey. The friends of Mr. Oakes and of the Northern Pacific system have reason to be pleased with these findings, as it justifies and strengthens their confidence in one of the most remarkably successful and popular railway officials in the country. The temporary embarrassment of this great trans-continental railway was brought about by causes ante-dating Mr. Oakes' connection with the road and entirely beyond his power, as an official of the road to prevent. In the sagacity of Mr. Oakes the bondholders of the Northern Pacific have great faith, and the events of the past two months justify the expectation that under his controlling influence the stocks of this great railway corporation will, as soon as the industrial conditions of the whole country shall have resumed their normal position, again occupy a prominent position in the list of American securities.

Mekarski Motors in Paris.

The Mekarski system for street railways by means of compressed air has been adopted on three lines operated by the General Omnibus Company, of Paris, according to Engineering. The lines in question are amongst the most important of the whole Paris system, and one, that from the Louvre to Sevres and Versailles, has a length of about twelve miles. The two other lines are 6.3 and 5.7 miles long respectively. Trains of three cars, seating fifty-one persons each, and drawn by a compressed air locomotive, will be used. The locomotives will be supported on six wheels, all coupled. They will weigh eighteen tons each, considerable adhesion being required to mount an incline of 1 in 23, which occurs on the Sevres line, when towing three cars, each of which, in the loaded condition, weighs eight tons. Twenty three of these locomotives are to be built, of which six will be kept in reserve. The air pressure to be carried in the reservoirs will be 1,138 lbs. per square inch, and a sufficient quantity of air will be carried to enable the locomotives to run twelve miles without recharging.

THE longest reach of railway without a curve is claimed by travelers to be that of the new Argentine Pacific Railway, from Buenos Ayres to the foot of the Andes. For 211 miles it is without a curve, and has no cutting or embankment deeper than 2 or 3 ft.

The "Foreign Patent" Humbug.

In an article reviewing our Patent System and setting forth its advantages over that of other countries Mr. Emil Starek, in the "Age of Steel," calls particular attention to the feature of protection and comparative validity of patents granted. The preliminary step in this country requires that the inventor submit "a written description" of his invention or discovery, called a specification, and the same must describe "the manner and process of making, constructing, compounding and using," an invention or discovery and must be "in such full, clear, concise and exact terms as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound and use the same; and in case of machine he shall explain the principle thereof, and the best mode in which he has contemplated applying that principle, so as to distinguish it from other inventions; and he shall particularly point out and distinctly claim the part, improvement or combination which he claims as his invention or discovery. The specification and the claim shall be signed by the inventor and attested by two witnesses." These are the provisions of section 4888 R. S.

Mr. Starek then calls attention to the fact that in this country the merits of an invention may be submitted to four different tribunals. First the specifications are examined by "examiners" and if their decision be adverse to the applicant he may appeal to a board known as "Examiners-in-Chief." From this board the case can be taken to the Commissioner of Patents and finally to the Supreme Court of the District of Columbia. "Under the English system," continues the writer, "there is no such system of examination. Patents are granted for everything that is applied for (that is, after complying with the necessary statutory provisions), and the value thereof is subsequently ascertained by litigation in the courts. The German system is analogous to ours in that there is a preliminary examination. In France the patents are delivered "without previous examination, at the risk and peril of the applicants, and without guarantee either as to the reality, novelty or merit of the invention, or the accuracy or exactness of the specification." Again, under our system, we have no such statutory conditions imposed on our inventors, nor burdened with heavy fees and annual tax as are practiced in other countries."

The September number of THE INVENTIVE AGE contained an excellent article from the pen of George G. Turri, the well known Australian patent attorney, in which the writer called the attention of inventors to the "legalized piracy" recognized by English laws and in substance warning them of the danger of delay in taking out patents in that country after the publication of their patent grant in the United States.

In the light of these warnings it is not surprising that inventors everywhere are inquiring how it is that alleged Patent Attorneys and Patent Brokers are advertising to obtain, for various considerations—frequently for a fee much less than is considered legitimate and proper by the profession generally—valid patents in Great Britain, Germany, France and other countries, after publication in this country.

Is the inventor being humbugged? Is he being asked to pay for patents of doubtful validity? Are these Patent Brokers really working in his behalf, or are they obtaining "advance fees" under false representations? These are questions the wise inventor will not only propound before he bites at the baits offered, but will see that satisfactory and conclusive answers are obtained.

Many inventors are being misled by the seductive literature sent out by Patent Brokers, who first gain the confidence of the inventor by impressing him with the value of his invention and then hold out to him the glaring possibility of effecting a sale—through them, of course—in foreign countries, if he will at once procure "provisional protection"—through them, of course—for fees represented as insignificant, but which the inventor finds, in due time were quite ample for the benefits secured.

NOTES AND NEWS.

Steam Power of the World.—It is said the world's steam engines aggregate more than 26,000,000 horse-power, equivalent approximately to the work of 1,000,000,000 men.

Branding Cattle by Electricity.—In Australia horses and cattle are now being branded by electricity from storage batteries. The temperature is uniform and the brand safe and artistic.

Paper Tires for Bicycles.—It is said a bicycle tire made of paper, stuffed with hair, is now being made that excels the rubber or pneumatic tire in every respect. While the life of a rubber tire is only two seasons it is said the new paper tires will last four seasons.

Largest Steel Plate Ever Rolled.—A press dispatch states that the Wellman Iron and Steel Works, Chester, Pa., turned out on September 6th, the largest steel plate ever rolled. It is a rudder plate for one of the new American Line steamers being built at Cramps, and is 450 inches long, 130 inches wide, 1¾ inches thick.

Rapid Cable Laying.—The first Atlantic telegraph cable took some twelve years for its successful laying. The last cable, which was laid in July last took just fourteen days for the work, and it was a 50 per cent heavier cable than the original cable. This last one makes twelve cables in the North Atlantic now in operation.

Electrical Mirage.—A French Academy paper by Mr. Berger, published in "L'Elec.," September 8th, describes and discusses a lightning discharge of great magnitude noticed recently in Prague; he mentions a photograph, which, however, is not reproduced; there were six distinct bolts which struck four buildings simultaneously; a curious phenomena shown on the photograph is that the shadow of the cupola of a building was projected on the sky.

Electricity's Possibilities.—Of the possibilities and probabilities of electricity, the prospectus of a proposed "national school of electricity," to be established at Chicago under the auspices of Edison and a number of other eminent electricians, says: "More than \$800,000,000 is employed in electrical pursuits today, and these figures are being increased at the rate of \$100,000,000 annually. Within a decade nine-tenths of the steamboating, railroading, canal hauling, illumination, domestic lighting, heating, cooking, factory operation, mining and machinery will be done by electricity. There are also many applications of electricity yet in an undeveloped state. Electricity is the most promising field in civilization today."

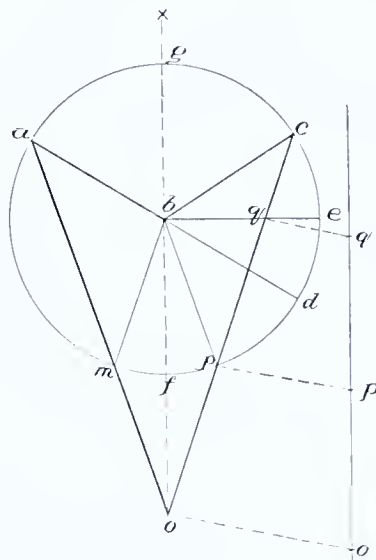
Ship Railway on the Columbia River.—An appropriation of \$150,000 has been made by Congress for the preliminary work on a ship railway to be constructed through the Dalles, on the Columbia River, in Oregon. The car that will be used will be 40 to 50 ft. in breadth, and long enough to carry vessels that can steam up the river, which in the spring months, when the water is high, will allow a draft of about 14 ft. The car will be sunk under water and the vessel floated over it; the car will then be raised by a hydraulic lift some 70 ft. above the water level to the height of the land track and the car run upon it. This land trick will consist of four or five railway tracks of standard gauges, and there will be no curves sharper than 2° .

To Generate Natural Gas.—Some time ago a theory was evolved by William Heckert, of Findlay, Ohio, which if the test about to be made in the "abandoned gas wells region" is successful will work a revolution in that section. Mr. Heckert's scheme is to force air, by powerful pumps, down into the gas-bearing rocks, which it will permeate, and thereby become infused with the active properties of the gas itself. It is contended that as now burned for fuel, the natural gas requires an admixture of nine parts of air to one part of gas, and that this mixing can as well be done in the earth as in the stove or in the furnace where it is burned. The great trouble in the gas region is not so much the decrease in the volume of gas as the decrease in the pressure. This has fallen off in a large portion of the Ohio field, from 400 lbs., at which it started, to 40 to 80 lbs., and this is found to be insufficient to convey the gas from the wells through the system of pipes to the point of consumption. The friction takes up all the initial pressure. By Heckert's process

this lost pressure will be re-established. His air pumps, constantly at work, will force enough air down one hole to create a pressure sufficient to force the remaining gas, mixed with the air, out of several other holes, and give it a strong initial pressure in the pipes. The gas thus formed or charged with air will be ready for burning with little additional mixture of air at the point of combustion. It is also claimed by Heckert that air thus pumped down into the rock and passing over and through the pools of oil which are now almost universal in the Trenton rock in this section will take up the volatile gas of the oil and force it up the convenient wells ready for use.

To Divide an Angle in Three Equal Parts.

Construction: Let abc be the given angle. Describe a circle with b as a center. Draw bd as a prolongation of ab . Bisect abc and $c bd$ and produce the bisector of abc till more than twice the radius over the vertex. Mark on a straight line the



Sign: $\mathbf{I}_2 = \text{Angle}$.

points $o p q$ in distances equal to radius. Take the line through point c , point q to fall in the line $b c$, point p in the arc $f d$, point o in the prolongation of the bisector. Take $o a = L o = L a = L c = \frac{a b c}{\text{---}}$

Proof: Take bp and bm $bp=op=ba=bm$ (equal to radius). bmp is a rhombus and $abpo$ is an isosceles trapezoid; each base makes equal angles with the legs, consq. $La=Lo$. Same thing can be done on the opposite side, gives: $La=Lo=Lc$. abg is an exterior angle to triangle abo ; an exterior angle of a triangle is equal to the sum of the two opposite interior angles, consq. $abg=bao+boa$; but go is the bisector of Lb and Lo , consq:

$$\begin{aligned}
L a b g &= \frac{Lb}{2} \text{ and } L b o a = \frac{Lo}{2} \text{ and now} \\
L \frac{b}{2} &= \frac{Lo}{2} + La = Le + \frac{Lo}{2} \\
Lb &= La + Lo + Lc; \text{ but } La = Lo = Lc, \text{ consq:} \\
La &= Lo = Lc = \frac{abc}{3}
\end{aligned}$$

Good erat demonstrandum.

EMIL, CHRISTIANI.

Books and Magazines.

The INVENTIVE AGE is pleased to note the fact that "Science," the New York magazine that found it necessary to suspend publication in March last, has perfected arrangements for starting up again, under a plan of co-operation with the American Association for the Advancement of Science.

The Photographic Times, is the name of a New York publication devoted to the art, science and advancement of photography. Its illustrations are of the highest order and the typographical appearance is unexcelled.

“The Untempered Wind,” a novel by Joanna E. Wood, a young Canadian author, is now ready for publication by J. Selwin Tait & Sons. This is Miss Wood’s first book and competent critics declare it to be fully entitled to rank with the masterpieces of the century—with, for instance, Charlotte Brontë’s first work and with the “Scarlet Letter” of Hawthorne. This book, however, is unique in itself and in its subtle analysis of village life and its vivid and accurate portrayal of character and also of the depths of cruelty to which the gentle sex will on emergency descend, it is unequalled in modern fiction.

The New American Liners.

Some of the details of the construction of the new ships, St. Louis and St. Paul, building for the American line, at the shipyard of the Wm. Cramp & Sons' Ship and Engine Building Company, together with copious extracts from the paper read by Mr. Charles H. Cramp before the American Society of Naval Architects and Marine Engineers at its first session in November last, together with a side view of the St. Louis, appeared in the New York Times, recently, occupying three full columns. The statement is there made that the St. Louis will probably launch about October 19th, the St. Paul following about two months later, and that both will go into commission next spring in time for the summer travel of next season. The following are interesting facts regarding these two vessels :

They are each more than one-tenth of a mile long. That is to say, if one of them were placed upon any of our avenues it would extend beyond two blocks, including the intervening streets. Twenty years ago a three thousand-ton ship was an exceptionally large vessel. Between these two monsters, as they stand today, there is upon the stocks a three thousand-ton ship which in comparison seems no larger than an ordinary tug boat. Twelve six foot men standing upon one another's heads would not reach from the ground to the main deck. The stairways erected for climbing up their sides have 140 steps between the earth and the level of the main deck. Standing upon the fore-castle the observer finds himself considerably above the roof of a six-story building; while to look down over the side produces the dizzy sensation of peering over a precipice. Contemplated from over the taffrail, the cruiser Minneapolis and the battle ships Indiana and Massachusetts lying in the adjacent docks, large vessels all of them, shrink into comparatively insignificant proportions. □ Accommodations will be provided for about 1,500 passengers, of which 350 will be first cabin, 200 second cabin, and 900 steerage. The arrangements of berths and saloons and the fittings and decorations will be the embodiment of American ideas as to comfort and attraction, and will differ in material respects from the prevailing style of European built steamships.

The advent of these ships will enable the American line to fulfill its contract with our government, under the Mail Subsidy Act of 1892, whereby each ship will receive something more than twelve thousand dollars for each trip, upon a basis of four dollars per mile for each mile covered on the outward voyage. This is the highest class subsidy provided for under that act, and requires an average speed of twenty knots an hour to be made under the test provided for by the government. The Paris and New York will also carry the mails under this law, so that the company will receive about fifty thousand dollars per month for their mail service, or at an average of six hundred thousand dollars annually for a weekly service of twenty knot ships.

In this connection the following extract from Mr. Cramp's paper read last November will be read with interest :

"The conditions of the mail contract between the Government and the International Navigation Company place at the disposal of the navy seven great ships, almost instantly convertible into commerce destroyers, averaging greater performance than the Columbia and Minneapolis. This practically reinforces the navy by \$21,000,000 worth of ships and that not only without cost of building, but also without the expense of maintenance and commission in time of peace. From this point of view, the policy of the International Navigation Company, of which these ships are the result, appeals to the best and loftiest public sense. It is more than a mere commercial enterprise. It is as bold a stroke of national ambition and patriotic aspirations as was ever made. It aims at achievements, the beneficial results of which will be felt in every household throughout our broad land."

Unsuccessful "Self-Electrocution."

Charles C. Hoffman, a Chicago tinmith, has been out of employment for some time, and to add to his misery, he said he was jilted by Kate Gallagher. He wanted to die. He chose the arc light in front of No. 59 Halstead street and dragging several empty boxes from a neighboring store and piling them one on the other, he erected a platform from which he could reach the carbons of the lamp. He did so and was thrown a distance of fifteen feet, tipping the boxes to one side as he fell in a heap on the pavement. Two police officers who witnessed the act called a patrol wagon and Hoffman was conveyed to the county hospital. After dressing his seared hand, the physicians discharged him, and he will probably be in a condition to repeat the attempt in a few days.

PATENT BROKERS AND AGENTS.

Some Explanations Made Necessary on Account of Queries from Inventors.

The gullibility of the average inventor is probably no greater than that of the average citizen who has never exhibited a particular penchant for invention, but certain it is that no class of people are beset by a larger horde of fakirs and humbugs than they. Indeed, so large is the army of "Patent Brokers," "Development Companies," "Patent Agents," and the like it would seem that the chief patrons, the majority of the subscribers of the Official Gazette of the United States Patent Office, were from among this class. The issuance of the Gazette each Tuesday, giving the name and address of each person to whom a patent has been granted, is followed on Wednesday by the mailing of as fine an array and as complete an assortment of "fake" and misleading literature as it is possible for the most vivid imagination to conjecture. So bold and fraudulent have some of these schemers become that it is necessary, in order to evade the vigilance of the United States authorities, to frequently change, not only their postoffice address, but the name under which they carry on their business as well.

THE INVENTIVE AGE has taken occasion to refer to this matter in previous issues and the accumulation of damaging evidence against many of the so-called "Patent Agents," and "Patent Brokers," justifies us in continuing and repeating the warning to inventors.

As THE INVENTIVE AGE has heretofore stated it does not desire to do an injustice to any person or association and in the last issue took occasion to frankly admit that upon the information to hand some of the concerns mentioned in a previous issue under the head of "Patent Sharks," should not have been so classed. Among these was the Philadelphia concern, "Association American Inventors," of which Geo. H. Holgate is President and General Manager. An investigation of the business methods of this concern by a special representative of THE INVENTIVE AGE demonstrated the strange anomaly that while apparent good faith was exhibited and sagacious means adopted looking to the disposition of patents after the contracts had been received properly signed and accompanied by the requisite fee, representations made to *obtain* business were often misleading and inconsistent. It was upon the means used for *obtaining* business and not the *methods* adopted, or the treatment of the client *after* he entrusted his business to these Patent Brokers that THE INVENTIVE AGE based its conclusions. The prosecution of our investigations has led the managers of some of these institutions to frankly admit that "even if they did humbug the inventor to obtain his business, after obtaining it they treated him squarely and fairly and worked in his interest." Ignorance of these modern business ethics as applied to inventors and Patent Brokers was the only excuse for mentioning some of these Patent Brokers under the heading of "About Patent Sharks." As soon as THE INVENTIVE AGE discovered an apparent exemplification of the claim that it was possible to obtain business through misrepresentations and then fairly, honestly and sagaciously conduct it, we did not hesitate to admit our previous, and upon this hypothesis, unjustifiable conclusions.

Readers of the September number of THE INVENTIVE AGE, however, have been more than ordinarily inquisitive, and while the letter of Dr. Gatling endorsing the "Association American Inventors," had much weight with THE INVENTIVE AGE, some inventors are skeptical and want "further information." One inventor writes us calling attention to the fact that Dr. Gatling says in his letter that "they, (Association American Inventors) *claimed or demanded*, from me *no money consideration* for their services, but agreed in the event they sold my patent they should have ten per cent," etc. "They must have made an exception in Dr. Gatling's case," says the writer, "for they did propose to charge me and I've got to get a circular from the first one yet that didn't want an advance fee," etc. Several readers of THE INVENTIVE AGE have called atten-

tion to this feature of Dr. Gatling's letter, but we do not see that it is of a very serious nature. The rule being to charge an advance fee of \$20, say, it is likely that an exception was made in Dr. Gatling's case because of the prominence of the inventor and the fact that his name for advertising purposes would be worth many times the amount charged the ordinary inventor.

Another reader wonders upon what information impressions of THE INVENTIVE AGE were based—wants to know wherein from their circulars we figure out misleading claims and statements. This can best be explained by the publication of the substance of letters addressed to Mr. Jas. A. Watson, a Washington inventor, under dates of December 11 and 14, 1893. In these letters Mr. Holgate says:

In looking over the Patent Office Gazette we find that your claims have been allowed and a patent issued to you, and after going over the claims embodied in the patent we think there is considerable merit in it, and we are willing to undertake the sale of the same if you will entrust your business in our hands. * * * We have lately negotiated with the largest commercial agency in the United States for 47,000 names * * * of investors, presidents of banks, boards of trade and chambers of commerce * * * Now that the Senate has repealed the silver bill the business interests of the country will revive and investors will be seeking investments for the money they have kept locked up, * * * and we will * * * make a reduction in your case and take one-half of our fee in advance * * * We wish to emphasize one fact * * * and that is that your patent is not worth one cent until you have realized something from it, or in other words, when you hear the jingle of the other man's money in your pocket, then you are certain that your patent has value. * * * In the last few days we have closed the following trades: Three Electric Patents, \$15,000; Fire Hydrant, \$12,000; Grain Scouring Machine, \$100,000; Pouring Tray, \$8,000; Pen Holder, on a royalty of \$500 a year; Ice Cream Freezer, \$10,000; Improved Sink Trap, \$35,000; Gas Machine, \$150,000; Door Check, \$8,000; Check Punch, \$16,000, and have several good trades just on the point of being consummated. We have also just started on a half million dollar company which we expect to raise in a very short time.

The letters contained a great deal more in this strain, but for the purposes desired the above synopsis is sufficient. The dates of these letters were December 11th and 14th, 1893, respectively. Prior to this—to be more precise—on August 24, 1893, Mr. Holgate sent a letter to Mr. R. Davis, of Washington, D. C., in which he claimed, among other things:

In the last few days we have closed the following sales: * * * Electric Patents, \$15,000; Fire Hydrant, \$12,000; Grain Scouring Machine, \$100,000, and have several good trades just on the point of being consummated.

It seemed to THE INVENTIVE AGE a strange coincidence that on dates *four months apart* "in the last few days we have closed sales" of precisely the same items for precisely the same amounts.

But this was not all. Under date of June 6, 1894, eight months later, Mr. Holgate wrote to Mr. Chas. Schifferdecker, Fort Assinaboine, Montana, saying, among other things:

In the last few days we have closed the following sales: Ice Cream Freezer, \$10,000; Check Punch, \$16,000; Gas Machine, \$170,000; Door Check, \$8,000; Coin Case on royalty, and have several good trades that will be closed up before the end of the week.

And then again, under date of July 7, 1894, Mr. Holgate wrote to Mr. Chas. A. Emerson, of Oshkosh, Wis., that:

In the last few days we have closed the following sales: Ice Cream Freezer, \$10,000; Check Punch, \$16,000; Gas Machine, \$170,000; Door Check, \$8,000; Puzzle, \$12,500; Reversing Gear, \$7,500; Coin Case on royalty, and have several good trades that will be closed up before many days.

Under date of July 25, 1894, the same wording is used in a letter to Susan M. Hoagland, of Hulberton, N. Y.—the same as a letter to Mr. S. E. White, of Watertown, N. Y., dated March 28th, *four months* previous. Even as late as September 5th last, Mr. Holgate was still making sales in the "last few days" of Ice Cream Freezers, Check Punches, Gas Machines, and the like—for the same sums as herein enumerated—for he so writes to several inventors.

Now what would be the impression of an inventor, or any other intelligent person, after comparing these statements? Would he not have been impressed with the remarkable coincidence of so many sales, on so many different dates for such similar amounts?

The above quotations are produced simply to let those of our readers who have made inquiries about the matter know what has influenced THE INVENTIVE AGE in its statements and conclusions. We thought it most remarkable that every "few days" prior to every Tuesday in the year it was possible for a patent agency to make such sales for precisely the same amounts. Upon the belief that the statements made to inventors were misleading and false we took occasion to humorously allude to the claims of Mr. Holgate in an article more particularly aimed at

patent sharks in Buffalo and Marilla, New York.

As before stated a further investigation disclosed the fact that, after obtaining the business, Mr. Holgate puts forth reasonably energetic and intelligent efforts to dispose of the patent in order that he may obtain the percentage agreed upon. We vouch only for what appearances indicate. What has been the experience of inventors? Have they sold your patents?

THE INVENTIVE AGE mistakes the judgment of its readers, the inventors of America, if they endorse this code of moral ethics. There exists no good reason why Patent Brokers should misrepresent the facts in order to obtain the agency for the sale of patents unless there be logic in the claim of the famous showman, P. T. Barnum, that "the people love to be humbugged." There is no reason why a patent agency cannot be conducted on strictly legitimate and business-like methods throughout.

How Inventors are Swindled.

There ought to be and must be a reform in the manner of doing business on the part of patent agents claiming to be legitimate. The inventors of America have long enough been the prey of unscrupulous and designing patent sharks, whom an indulgent government allows the use of the mails for fraudulent purposes. It is a fact that will not be denied by any intelligent investigator of their business methods that four-fifths of the so-called patent agencies and patent brokers are frauds. Only the co-operation of reputable attorneys of the country and their clients, the inventors for whom they have obtained patents, is necessary to drive scores of these vampires out of their nefarious business.

THE INVENTIVE AGE will do its share, will the inventors and the reputable patent attorneys assist?

Many of the circulars and propositions received by inventors are an insult to their intelligence and an assumption of their cupidity.

This patent humbug business has its pathetic as well as humorous features. An inventor in a Massachusetts town, upon the representations made by one, Darnall, claiming to be editor of an educational journal in Lexington, Ky., parted with his model and drawings which cost him \$10. Now the inventor writes THE INVENTIVE AGE as follows: "Can't get a peep out of Darnall, editor and manager of the Educational Herald. I have had so many letters from frauds that it seems to me as if creation was one vast hotbed of lying and satan, and all his subjects were in a conspiracy to cheat a poor old man who is almost to the end of life's short journey."

A very innocent, honest appearing and carelessly concerned sort of a chap is the real estate fakir. He wants to know if the inventor desires to sell his patent. Of course he does, and in reply to his admission to this effect the shark advises him that it is difficult to find a cash customer, but he has a party on the string who will "give him a few, say five, choice lots in lake shore addition to the stock yards, worth \$550 each, for his patent and \$500." Now what impression does the fakir intend to convey? The average inventor believes he is to receive \$500 in cash and the five lots worth \$550 each. But that is where he is wrong. Another communication, in reply to a letter of acceptance on the part of the inventor, advises him that he has not understood the proposition. He, the inventor, is to *pay* \$500 in cash and throw in his patent for these "valuable lots." But the proposition varies. Some of the lot sharks write back, after the offer has been accepted by the inventor, and advise him of the fact that he has the papers all made out, but the parties with whom he is negotiating first want the scope and validity of the patent examined to satisfy themselves that no litigation will follow, which requires "a small fee" to be paid by the inventor, of course. It is needless to add that the "fee" is all the shark is laying for. Still another change is worked on the land scheme. The inventor is asked to trade even. Some correspondence is had in which the broker appears to take more interest in the inventor than in the investor. Finally after a fee has been paid to look up the title still another fee is wanted to "clear off a slight encumbrance." As transparent a fraud as this scheme is, one of the most prominent inventors and manu-

facturers of the country was caught by it only a few weeks since.

So annoying have some of these Patent Agent fakirs become with their circulars and specially "dictated" and "personal" letters to inventors that some reputable patent attorneys find it advisable to warn their clients of the prevailing pitfalls that have been dug for them—a late circular reading as follows:

We have been made aware of so many attempts by so-called Novelty Companies, Sale Agents, Protective Unions, etc., to swindle our own clients, that we have determined to prepare a circular, warning unwary inventors against swindlers. Old inventors, those who have gotten their second or twenty-second patent, do not need warning. Some of them have been educated in the "school of experience" and this advice is not for them, but they know how much it is needed by the average inventor, who has just received his first patent, had his name and address published in the U. S. Patent Office Gazette, and is receiving tempting circulars from a horde of swindlers who look upon a fresh inventor as their particular prey.

So-called Novelty Companies do not want to buy your patent, and when they or others want you to pay for a scope and validity examination, they are simply inviting you to pay them, or their pals and partners, for services which they are incompetent to render and which you do not now need.

Inventors seem to be regarded by the swindling world as peculiarly green and gullible, and as soon as their names are published in the U. S. Patent Office Gazette, a whole horde of beasts of prey swoop down upon them. We have long been sending a printed letter of warning to our own clients just before the publication of their names in the Gazette, and while we cannot get at the names of other inventors until after the weekly issue of the Gazette, we hope we may be in time to save some from the clutches of swindlers.

THE LAND TITLE SCHEME.

Among the dispatches in the daily press of January 5th last, appeared the following:

Sigourney, Iowa, Jan. 5th.—Post Office Inspector Mercer yesterday arrested B. H. Wills and William A. Bell, both prominent citizens, and managers of State patent investment companies. The arrest caused a sensation, as both men have been for years transacting a big business. The plan of the concern was to watch the daily papers and get a list of patents granted. The victim was informed that he could trade his right for a farm, but it would cost \$40 to look up the title. The money was sent, and then, in due time, the victim was advised not to make the trade, as the land was heavily encumbered.

Regarding this transaction and similar fakes George B. Grant, a correspondent of the American Machinist, comments as follows:

The only remedy is to teach the possible victims that there is not one chance in a thousand that an offer from a patent-selling concern is anything whatever but an introduction to a "mean swindle," as mean as or meaner than the above.

The crop of patents issued each week is about five hundred, and not half of them are for genuine inventions. The bulk are for mere contrivances of lawyers, amateurs, farmers, ladies, boys, and unmechanical people of all sorts, and are not worth a copper each.

Take a sample case, not an imaginary but a real and frequent case, and follow it through. A brakeman invents a car coupler, but, as every brakeman in the country has invented a car coupler, the subject is worn thin and there is nothing new to be had in that line. It is easy enough to contrive some new quirk, to add a dingus above or a wingwang underneath, but not one patent a year shows an item of the smallest value. Of course, the brakeman applies for a patent, and, of course, he employs one of the "no patent, no pay" solicitors, whose business it is to forge gimcraks into such formal shape that some sort of a patent can be worked over each case. He gets some sort of a patent on the car coupler, good or bad, but it has a red seal and a blue ribbon, and it is all the same to the brakeman. The shyster—and I use that term with care—cannot fail to get a patent on anything presented, he secures his share of the booty, drops the matter, and things are ripe and ready for the third partner—the patent-selling shark.

The shark has various methods, changing his game as fast as found out; and this title-examining dodge is as good as any. It is thoroughly hidden, very simple, apparently very honest, and quite safe. The shark sends out his circulars, and the brakeman, after writing a dozen unanswered letters to railroads and car manufacturing companies, is tempted to see what he can do through him. A little correspondence follows, and he receives a statement that the patent can be exchanged for a certain farm. Brakeman is not at all astonished at the offer of a farm for his invention, had expected more than that, and tells the shark to go ahead. Shark then writes the brakeman that it is wise to have the title of the land examined, at an advance fee of forty dollars, and the trick often works and yields the shark a "big business."

The government has beat the brakeman \$35, the solicitor \$50, the shark \$40; all shake hands and proceed to do up the next inventor.

It is not the intention to cover the whole realm of patent humbugs in this article; in fact, the mere synopsis of the most casual reading of the literature of these concerns already gathered by THE INVENTIVE AGE would fill many pages of this magazine. More extended mention of them will be made in successive numbers.

THE INVENTIVE AGE for one whole year, sent to any address for \$1.

Patent Right Sellers.

The following communication from a subscriber of THE INVENTIVE AGE opens up another feature—another branch of the patent brokerage business—not heretofore touched upon, viz: the validity of foreign patents which nearly every Patent Right Seller is anxious to obtain for the American inventor just as soon as the mails can reach him after the issuance of the Patent Office Gazette each week:

EDITOR INVENTIVE AGE:—The brave, kind and important work that your most excellent journal has been doing the past few months for inventors and patentees, by an exposure of unscrupulous Patent Right Selling Agents, called by some "Sharks," is very commendable; and while in your last issue—September, you show a proper disposition to make "The Amende Honorable" in any case that wrong may have unwittingly been done to any honest Patent Right Seller, or association, I respectfully say that I deem it your sacred duty, under the circumstances, as a watchman on the walls, to demand of dealers or sellers of patent rights, an explanation of such things as appear in their circulars, which, unexplained, seem impossible of performance, nay more, do not have the appearance of being beneficial to inventors and patentees of the United States, in view of the foreign laws relating to patents taken out in foreign countries, after the issue of patents in the United States.

I observed in a circular addressed to a patentee whose application had been filed in the United States Patent Office over a year, and on which application his patent was recently granted, an offer to take provisional protection, "Gebrauchsmuster;" and patents in certain countries named in the circular, for the sum of \$245, and, in view of this offer, I hold that it is incumbent on those making it, and who receive such a large sum of money, to give the United States patentee something of real value in exchange therefor.

I desire to know what benefit would accrue to a person who has already had his patent issued in this country upon an application filed over a year ago or even seven months prior to the issue of his patent, by taking provisional protection in Great Britain, "Gebrauchsmuster" in Germany, and patents in France, Belgium, Austria, Hungary, Switzerland, Italy and Sicily? Would he not be paying out \$245 for provisional protection, and patents, that would be pronounced useless, and invalid in view of the fact of the inventions therefor having been patented and published in the United States and thereby publicly made known in foreign countries.

Explanations are in order, in view of the letter of the venerable, honorable and highly esteemed Dr. Gatling, referred to in your September issue.

A SUBSCRIBER.

Important Events of the Month.

SEPT. 1—Great forest fires raged in Northern Minnesota. Several small towns were burned and in their efforts to escape over 300 persons were burned to death. By floods in Texas many lives were lost. Samuel J. Kirkwood, Iowa's war governor, died at Des Moines, aged 81.

SEPT. 3—The loss of life by forest fires is found to be greater than at first reported. Fire destroyed the building and a large part of the stock of the Trenton, (N. J.) Potteries Company. Spain canceled the reciprocity treaty between the United States and Cuba.

SEPT. 4—The republicans carry Vermont by 27,000. James Clark Welling, LL. D., President of the Columbia University, Washington, died at Hartford, Conn., aged 69.

SEPT. 5—Dr. Cook's Greenland expedition arrives at North Sidney, Cape Breton. Over 1,000 refugees from the forest fire district are being cared for at Duluth.

SEPT. 6—The Sugar Planters' Convention at New Orleans, declared in favor of an alliance with the republican party on national issues. The Pullman strike was officially declared off. Robt. J. lowered the world's pacing record at Indianapolis, to 2.02½.

SEPT. 8—The rage of the forest fires was checked by rain. The Count of Paris, died at his English residence.

SEPT. 9—The Chinese Admiral Ting has been degraded for cowardice.

SEPT. 10—The republicans carry Maine by over 38,000. The annual encampment G. A. R., began at Pittsburgh. The American Society of Irrigation Engineers held its second annual convention at Denver. Dalton, Ohio, has a \$250,000 fire.

SEPT. 14—Robert J. paced a mile in 2.01½ at Terre Haute. Two important battles are reported to have been fought in Korea in which the Japs were victorious.

SEPT. 15—Congressman Breckinridge was defeated for re-election by Owens. Fire at Scranton destroys \$250,000 worth of property.

SEPT. 16—In the battle at Ping-yang the Japanese routed the Chinese force of 20,000, killing and taking prisoners 17,000 of them.

SEPT. 17—In a naval conflict off the mouth of the Yalu river, four Chinese vessels are sunk by the Japanese fleet.

SEPT. 19—At Galesburg, Ill., Alix trots a mile in 2.03½, lowering the world's record a quarter of a second.

SEPT. 21—Desha Breckinridge, son of Congressman Breckinridge, stabbed J. D. Livingston and attacked Judge G. B. Kinkead, at Lexington, Ky.; the affair grew out of the late Democratic primary.

SEPT. 22—Seventy-five persons are killed in the path of a tornado that sweeps over Central Iowa and Southern Minnesota.

SEPT. 23—St. Mary's College, Oakland, Cal., was partly destroyed by fire; loss, \$200,000—Gen. Willard Slocum died at Ashland, Ohio, aged 74 years.

SEPT. 25—The President appointed Gen. William Ward Duffield, of Detroit, Mich., superintendent of the Coast and Geodetic Survey, vice Prof. T. C. Mendenhall, resigned. Six A. R. U. leaders were sentenced at Butte, Mont., to fine and imprisonment for contempt of court and interference with the mails during the recent strike. Two A. R. U. strikers were sentenced at Los Angeles to fine and imprisonment for intimidating railway employees. Gen. Thomas Seir Cummings, the artist, died at Hackensack, N. J.

SEPT. 27—Capt. Henry W. Howgate, formerly chief executive officer of the Weather Bureau at Washington, who is charged with having stolen over \$300,000 from the Government, after being a fugitive for thirteen years, was arrested in New York City, where he was keeping a second-hand bookstore under an assumed name.

SEPT. 28—The New York Constitutional Convention ratified its work by a vote of 95 to 45, three Republicans voting with the Democrats in the negative.

SEPT. 29—The Federal grand jury at San Francisco returned 40 indictments against strikers for alleged interference with the mails and with interstate commerce.

SO MANY of the inventors of the country are making inquiries for the name and address of manufacturers of novelties, THE INVENTIVE AGE has decided

to publish the address of such reliable manufacturers as desire to reach the inventors and owners of patented novelties.

The New French War Vessel.

The Carnot, a new armored vessel for the French navy, has just been launched at Toulon. The ship was built on the plans of M. de Saglio, director of naval construction, and the late President Carnot fastened the first bolt. It was to have been called the Lazare Carnot, after his great grandfather.

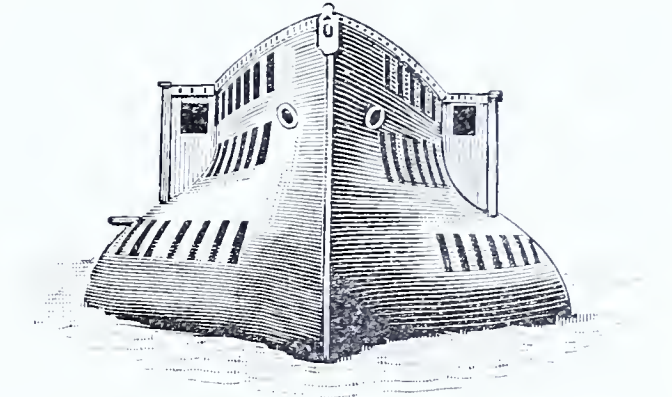
The hull of the Carnot is composed of two parallel walls, dovetailed into each other without a break as far up as the armored plate. The double hull is divided lengthwise by seven partitions: it has five longitudinal bulkheads and eighteen transverse bulkheads.

There are three decks, the armored deck, the gun deck, and the main deck. The armored hurricane



deck is constructed of a double thickness of sheet iron 4-10 of an inch thick, and covered with armor 3 inches thick. The length of the vessel between perpendiculars is 364 feet; its breadth 66.

The armament of the Carnot will consist of two twelve inch guns in the forward and central turrets of the vessel, two turrets for the ten and a half inch guns, eight turrets, four on either side, for the five



and a half inch long range guns, and six rapid fire guns on the upper decks. The turrets are protected by armor sixteen inches thick. The exterior armor will rest on a backing of teak eleven inches thick and will be seventeen inches thick.

She is expected to make seventeen knots an hour. She will have two vertical triple-expansion engines, with a maximum of 15,000 horse power, constructed according to the plans of M. Garnier, Sub-director of Naval Construction at Toulon. Steam will be generated by 24 cylindrical boilers, with double grates, on the Lagrafel and d'Allest system, registering 33 pounds. The total cost of the vessel will be a little over 21,000,000 francs.—N. Y. Sun.

The Cultivation of Rice in Siam.

The cultivation of rice in Siam—one of the greatest rice producing countries in the world—is carried on in the most primitive manner; indeed—says Robt. M. Boyd, Vice-Consul-General, at Bangkok in a recent communication to the State Department—no progress has been made in the past hundred years in this line. Beyond the use of the crudest of bull tongue plows and the machinery in the rice-cleaning mills in this city, no implements or machinery of any kind is employed.

Without the buffalo the Siamese rice cultivator would be without his most important aid. This large beast is used as the motive power in front of the bull tongue. He draws the rice in from the fields after it is cut, and he is also used for thrashing, being driven backwards and forwards over piles of rice heads. After tramping in this way some hundreds of miles, he succeeds in separating, in the course of two or three months, about as much grain from the husk as a mill run by an electric hand battery would turn out in twenty-four hours.

The Siamese, as a rule, are not prejudiced against the introduction of western ideas; indeed, the controlling element is rapidly adopting them. The palaces and public buildings are built on modern plans; the army and navy, as well as the customs, are run under western rules. On the streets can be seen carriages of the latest designs, and electric tramways from the United States, paying large dividends, are running through the crowded thoroughfares. Railroads are being constructed into the rice-producing districts to take the place of the row-boat in delivering products on the market, and many other marks of progress help to convince one that American agricultural implements, especially those suitable to the cultivation of rice, could be introduced here with profit to all concerned if our seemingly dormant manufacturers would undertake in some way to place their goods upon these markets.

The New "All-Submarine Cable."

The various troubles incident to the maintenance of shore line connections between New York and the Nova Scotian coasts, made the Commercial Cable Company resolve to bring their new cable direct by sea into New York City; and the feat was accomplished on Sunday, September 2. Among the troubles rendering this plan preferable, despite the dangers that lurk for a cable on the floor of busy New York Bay, are the breakage of land lines in storms, the difficulties of winter repairs, the destruction of cables in long subways by gases, and more lately the interruption and distortion of signals by the current from trolley lines in Brooklyn, which parallel the old Commercial Cables from their landing at Coney Island up to the Brooklyn Bridge.

At noon on Sunday, September 2d, the laying of the Commercial All-Submarine Cable to New York City from Europe was completed, and the sight of the trim cable ship "Mackay-Bennett" actually at work in New York harbor created quite a sensation if one can judge from the noisy salutations received from all manner of craft as she slowly but carefully continued her work up to the Battery. There is no necessity to describe the apparatus on board the "Mackay-Bennett," as nearly everyone connected with electrical industries is now generally familiar with it. One little thing your representative saw which may not have been noticed by some people was the Thompson sounding tubes. These tubes are of glass two feet long by about one-eighth inch outside diameter. They are orange colored on the inside with some secret pigment and one end is sealed. This tube is inserted in a metal case secured open end downward. The ordinary sounding drum is all right for say 200 fathoms, but as the wire runs off the diameters get shorter and the revolutions do not register accurately; with this tube it is simply a matter of density of the water. The lower the tube drops, the higher the water is forced up it, compressing the air and discoloring the orange tint to a dark grey. Upon recovery, the height of the discoloration is measured on an ordinary foot rule and the depth worked out from a corresponding coefficient. These coefficients are placed alongside the rule for convenience, so the depth is ascertained at once. In running out the sinker the officer has his right hand on the brake of the drum and in his left holds a skid with which he puts a slight tension on the running wire; by the sense of touch he is able to tell at once when the sinker strikes bottom. By this means it is possible to sound to 3,000 fathoms in about 15 minutes—a slight difference from the 1½ hours to 2 hours in the old days, not counting the distance the ship had drifted in that time.—*Electrical Engineer.*

The Maxim Flying Machine.

A few additional facts of interest in regard to Hiram S. Maxim's flying machine were brought out at the recent meeting of the British Association for the Advancement of Science. Although living abroad because he believed himself ill-treated by the United States government in connection with his rapid-fire gun patents, this gifted inventor is an American, and any glory which may be conferred by his success in aerial navigation belongs to this country.

One of the most remarkable features of the trial airship is the lightness of its motor. The engine proper weighs only 644 pounds, and the boiler (containing 20 pounds of water) 1,200. As the latter figures also include various appurtenances of the boiler, and as 362 horse-power were actually developed, we have only five pounds of engine and boiler to a horse-power. Mr. Maxim himself believes that he can get 500 horse-power out of that same engine.

In passing it may be well to recall that an ordinary locomotive weighs about 100 or 150 pounds for every horse-power it develops; marine engines in big steamships, from 200 to 500, and even engines for fast, light yachts of large size, seldom less than 100. A good draught horse weighs about 1,500 to 2,000 pounds to a horse-power; but a bird in flight only 20 or 25 pounds. Engineering experts have computed that in order to make aerial navigation a success the motive apparatus employed must weigh less than this. In a few exceptional instances small engines, not including the boiler, have been built which reduced the proportion to between 7 and 15 pounds. Mr. Maxim's achievement, therefore, is utterly without precedent, though Prof. Langley is said to have come pretty close to it with a ratio of 1 to 6.

Over 300 pounds of steam have been carried in

some of the trials, and the inventor says that he can run the pressure up from 200 to 300 pounds inside of a minute. Naphtha is the fuel used, of which 200 pounds are carried. There are also 400 pounds of water in reserve. Frame-work, aeroplanes, propellers and human freight bring the total weight up to three and one-half or four tons. A lifting power of about 10,000 pounds is developed when full speed is attained—that is, from thirty-five to forty miles an hour. About 375 revolutions of each of the huge two-bladed propellers a minute has been



LAYING THE LAST SECTION OF THE ALL-SUBMARINE CABLE.

the maximum thus far. The aeroplanes, which look like a flat roof and a pair of huge horizontal wings outstretched therefrom, have a lateral spread of more than 120 feet and an aggregate area of 4,000 square feet. These parts of the machine are made of thin and very strong steel tubes and wires, covered on the under side with balloon cloth. It was found impossible to keep this latter from bagging, no matter how tightly stretched. The upper surface, therefore, was irregular, and afforded much resistance to the air. The inventor has consequently covered the top as well as the bottom of the frame with cloth, and the upper cloth is held down with lines running fore and aft. This double-skin aeroplane overcomes a hitherto apparently insuperable difficulty—the buckling of the cloth surface.

Lord Rayleigh declared that Mr. Maxim had solved three out of the five chief problems involved in aerial navigation, and he had confidence that the inventor's great ingenuity would enable him to solve the others. Available reports of Lord Rayleigh's remarks do not quote him as specifying what these two remaining difficulties are, but they are probably balancing and steering the craft in free air. Ability to lift and propel it has now been fully demonstrated. Prof. Langley of Washington, who, by the way, took occasion to declare that he has not yet gotten up any airship of his own, expressed admiration of Mr. Maxim's work, and expressed a belief that the world would see practical airships in use before the close of the century. Lord Kelvin also commended our fellow-countryman's efforts, though he was inclined to think that a platform with four vertically working propellers at the corners would afford a better plan of operation. Some doubt was expressed by others whether Mr. Maxim estimates highly enough the skin resistance or friction of his aeroplanes. On the whole, though, both inventor and invention were treated in a highly encouraging manner. The leading British experts in mechanical science were present—men of world-wide reputations, and not given to toleration of cranks, especially if foreigners. Such a recognition of the merit of Mr. Maxim's work is not without significance.—*N. Y. Tribune.*

Names of Patent Solicitors.

Names and addresses of attorneys practicing before the United States Patent Office, carefully compiled by Virginia W. Middleton, for sale by the INVENTIVE AGE; cloth \$1.50; paper \$1 Edition limited,

The Magnolia Metal's Important Connections.

The Magnolia Metal Company has just received an order from Messrs. J. I. Thorneycroft & Co., Admiralty Machinery Contractors, of Chiawick, to be used in the Torpedo Destroyers they are building for the British navy. The following is a list of vessels in the British navy in the bearings of which the Magnolia Metal is used: "Fervent," "Ardent," "Zepher," "Hood," "Hawke," "Crescent," "Boxer," "Bruiser," "Edgar."

The following testimonials given by some of the most eminent marine institutions of this country, which are builders of the war vessels of the United States government, and for steamers of private corporations, show that the Magnolia Metal is used in the highest class of marine work, and is more meritorious and successful than any other anti-friction metal for that kind of work.

BALTIMORE, MD., June 8th, 1894.

Magnolia Metal Co., 74 Cortlandt St., New York.
GENTLEMEN: In reply to your inquiry of 6th instant, we take pleasure in stating that Magnolia Metal was used in the engine bearings of Cruisers Nos. 9 and 10 "Montgomery" and "Detroit," wherever anti-friction metal was required.

Very respectfully,
The Columbian Iron Works and Dry Dock Co.,
WM. T. MALSTER,
President.

BATH, MAINE, June 4th, 1894.

Magnolia Metal Co.,
GENTLEMEN: In answer to yours of June 1st, we used Magnolia Metal on the U. S. Gunboats, No. 5, Machias, and No. 6 Castine and Harbor Defense Ram, No. 1 Katahdin. This metal was used exclusively in the above vessels.

Yours truly,
Bath Iron Works, (Limited),
EDWARD W. HYDE,
Treasurer.

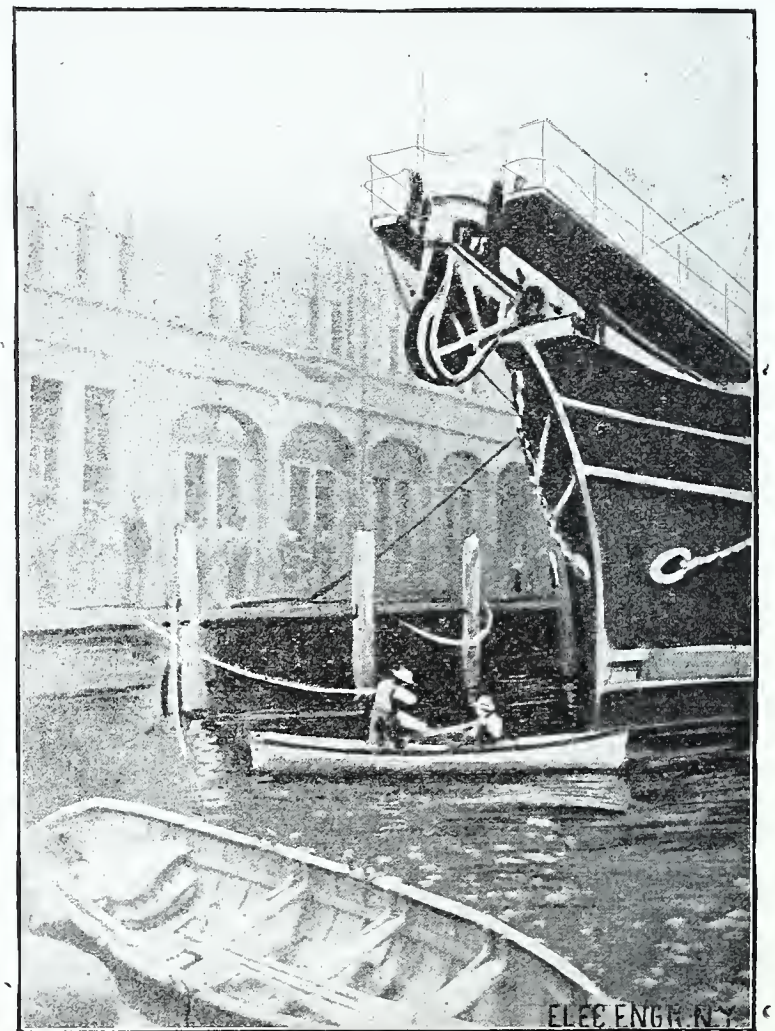
NEW YORK, June 25th, 1894.

Magnolia Metal Company, 74 Cortlandt St., N. Y. City.
GENTLEMEN: In reply to your inquiry, we take pleasure in stating that we have used the Magnolia Metal on different occasions and so far as we know, it has universally given satisfaction.

Very truly yours,
GEO. E. WEED,
President.

HOBOKEN, N. J., Aug. 30th, 1894.

Anti-Friction Magnolia Metal Co., 74 Cortlandt St., N. Y. City.
GENTLEMEN: We have used Magnolia Metal more or less for



LANDING THE CABLE AT NEW YORK CITY.

many years and have always found it good, and can recommend it for general use.

Respectfully,
E. R. MEAD,

Have this day given order for one (1) ton Magnolia Metal.
W. & A. FLETCHER, CO.,
H. W. FLETCHER.

All marine engineers should use Magnolia Metal in the bearings of their steamers, as it lasts longer and gives less heat than any other metal.

Magnolia Metal is in use by eight leading governments, and is the best anti-friction metal for all machinery bearings.

Southern Burial Ovens.

Of all the unusual uses to which brick is adapted and employed, probably none attracts the gaze of a northern man more than a visit to the cemeteries of the south. In New Orleans, especially, is this striking utilization of brick in the construction of vaults for burial purposes. As is well known, the extreme amount of moisture in the soil of that part of the state, amounting frequently to complete saturation, renders impossible the method of burial most commonly employed, as a grave could not be excavated to anything like the necessary depth, even with the aid of a pump to remove the water which pours in.

The cemeteries are laid out with exquisite taste and at great expense and are the pride of all classes of society. The wealthy employ delicately tinted and expensive marbles, the vaults being constructed to contain from two to ten occupants, while religious, civic and secret societies often club together and erect brick structures, sometimes with marble fronts, with a sufficient number of compartments to accommodate as high as 100 bodies.

For the poorer classes, however, who cannot afford so expensive receptacles in which to rest their bones, provision is made as shown in our illustration. On one or more sides of the cemetery, in some instances, fully a half mile in length, are built brick walls of three or four tiers of compartments, or ovens, as they are called, into which, in regular order are placed the caskets containing the body, which the opening is barely sufficient in width, height and length to receive. The front is then filled in with brick and cement, thus hermetically sealing the oven, while the front is finally faced with a cheap marble or metal slab, bearing the inscriptions placed upon a tombstone.

The First Monopoly Patent.

The absence of reliable information concerning the history of patents for invention under the common law has been noted with regret by several writers. The Statute of Monopolies in 1624 is known to have been based on the law declared in the case of *Darcy v. Allin* in 1602, but as this case in its turn appeals to decisions of a still earlier date, no definite conclusion can be drawn therefrom as to the period in which the first monopoly grants were made. The alchemical patent of Edward III., quoted by Hindmarch, proves on examination to be either a warrant for the arrest of two alchemists, or one of a series of dispensations from the law of Henry IV. by which the practice of multiplication was forbidden. The Commission appointed by Henry VI. to inquire into the feasibility of the philosopher's stone issued no report, and the alum patent cited by Farcy before the Parliamentary Committee of 1829 resolves itself into a permission to an Italian merchant to import a fixed quantity of that commodity. In default of facts, therefore, English and American writers have been driven to accept as genuine the theory of Collier, who, in his essay on "The Law of Patents," published in 1803, traced the origin of patent law to the charters of the Trading Companies and City Guilds. But these charters, which gave legal recognition to certain voluntary associations on the ground that they had existed from time immemorial, conferred no new rights. The patent, on the other hand, creates a right not otherwise recognized by law, the validity of which is practically decided on, the question of the novelty of the manufacture therein claimed. The assumed connection, therefore, rests on no historical basis, and no apology will be made for an attempt to substitute a theory, the truth or falsity of which, at any rate, can be easily tested by the records themselves.

As the result of a search, believed to be exhaustive, through the voluminous patent rolls of Elizabeth, it may be stated, with some degree of confidence, that the practice of granting monopoly patents was inaugurated in 1561 with the issue of the grant which is here reproduced. The momentous

and unforeseen changes which this novel departure was destined to produce, have tended to obscure the fact that the policy underlying these monopoly grants was one which had been pursued with a varying measure of success from a very early period. A few instances out of many will serve to show that the germ, out of which the latter system was developed, is to be found in grants of a much earlier date. In 1331 letters of protection were granted to John Kempe, authorizing him to settle in England with



BRICK BURIAL OVENS.

his apprentices to introduce the manufacture of woollens and to teach it to the English, and in 1337 a statute confirming this patent was passed, which declares that "all cloth-workers of strange lands may come and settle where they choose under the special protection of the King, who will grant them franchises, as many and such as may suffice them." Similar privileges were issued in 1368 to three clock-makers of Delft, and in 1440 John of Shiedame was invited to bring 60 workmen with him to instruct the English in the new art of salt-making recently invented in the low countries. According to this theory of patent law, the policy which dictated these grants was due to a sense of the industrial inferiority of this country, as compared with that of foreign countries, and at first did not contemplate the recognition of the right of an inventor to the exclusive use of his own invention. The theory at once explains why, under the Statute of Monopolies, the importer always occupied the same position as the "true and first inventor," the fact, of course, being that under the common law the inventor had no claim to a special privilege except as the introducer of a new industry. A perusal of the early monopoly grants of Elizabeth proves that most, if not all, of these were issued either to foreigners or to natives associated with a foreigner, or to native importers of foreign manufactures. In the recital of a grant to George Cobham, who had introduced certain new dredging machines from abroad, the Queen declares her hope that the favorable treatment of this patentee "will give courage to her subjects to study and seek for the knowledge of like new engines and devices," thus corroborating the view that the rights of the native inventor were derived from those previously enjoyed by the foreign importer. The circumstances which led to the insertion of the monopoly clauses in these instruments can here receive but brief notice. It is probable that the suggestion was made at the instance of the foreign experts who were brought over early in this reign, and that the policy was adopted by the Queen as the only alternative to starting the new industries under State supervision and at State expense. The latter assumption is justified by the close connection which existed between the Crown and the early monopolists of saltpetre, alum, copper, brass, and other manufactures which were successfully established under the new system. On the former point direct evidence exists in a petition addressed to the Queen in 1559 by one Acontius, an Italian inventor, who therein urges the value of a general prohibition as a means of rewarding the inventor. Acontius was undoubtedly acquainted with the existence of similar monopolies on the Conti-

ment, traces of which are to be found in the Papal monopoly of alum, and the exclusive and hereditary privileges of the French glassmakers. This letter was reprinted in full by the *Antiquary* of 1885, in a series of articles on "Early English Inventions." The statement that no patent was granted on this application is erroneous, for in the seventh year of the reign, when the policy of the patent system had been definitely adopted, Acontius received a privilege of 20 years.

Turning now to the first patent of monopoly, Stow informs us that soap making was first established in London about 1542 by John Lane, of Grace church street, "before which time the City was served of white soap in hard cakes called Castell and other, and of grey soapspeckled with white, very sweet and good, from Bristol." The latter apparently was a soft potash soap, for we are informed from other sources that at this period the "soda of England was not good." The foreign soap, on the other hand, was made with the alkali obtained from the ash of barilla, a marine herb growing near Alicante, and largely employed in the Spanish and Italian glass industries. In the absence of any direct tradition respecting this grant, coupled with the fact that the process was repatented in 1622, we must conclude that the attempt to introduce this industry resulted in failure.

De licencia pro Stephano Groyett et Antonio le Leurier.

Elizabeth by the Grace of God, etc. To all our Justices, officers Ministers and subjects whatsoever greeting. Knowe ye that we for dyverse weightie causes vs moving of our speciall grace and of certen knowledge and mere mocyon have geven and by theses presentes graunted vnto Stephen Groyett and Anthony le Leurier full priuiledge and auctoritie that they and every of them and the survivor of them and not any other by themselves and there servauntes whereof tow at the least shalbe of our leges and subjectes borne within our Realme of Englonde for the space of tenne yeares next ensuyng the date hereof in place and places convenient within this our realme of England not beinge within our Citie of London nor nere to anie the places or mansion houses of vs our heires and successors or of any our nobilitie or Councell at theses present builded to the annoyance of the same shall and may worke and make within this our realme of England white harde sope as well in greates as in small cakes to be like of goodnes fynes and puritie as the sope which is made in the sope house of Triana or Syvile in Andelizoi. And therefore we do by theses presentes straightly charge and comaunde and also prohibitte all other our subjectes as well denizens as not denizens at theses presentes not vsing within this our Realme the makinge of the saide white harde sope that they nor any of them during the saide terme of tenne yeares shall within this our realme make or attempte to make any white harde sope upon payne of imprisonment and forfeiture of all suche sope as shalbe made by them or any of them contrary to the tenor hereof. The one moitie of whiche forfeiture shalbe to the vse of vs our heires and successors. And the other moitie thereof to the partie that will seaze the same or sue for the same in any our Courtes of recorde by informacon writte bill playnte or otherwise. Provided alwayes and our pleasure is that all suche sope as by vertue of this our graunte or priuiledge shalbe made within three Miles of our Citie of London shall and may be viewed and tried from tyme to tyme by the order and appointment of the Mayor and Aldermen of London for the Tyme beinge And that all suche sope as by vertue hereof shalbe made in any other place of this our Realme more then three myles distaunt from the said Citie of London shall and may be viewed and tryed from tyme to tyme by the order and appointment of suche as the Lorde Chawncellor or keeper of the grete seale of this our realme for the tyme beinge shall assigne and appointe. And if any of the said sope made and offered to sale shalbe founde defectiue vntuly or deceitfully made or wrought contrary to the extent of theses presentes that then and from thencefurth this our graunte and priuiledge shall furwith cease determine and be voide anie thinge before mentioned to the contrary hereof in anie wise notwithstanding. Wherefore we will and straightly charge all our said justices officers Ministers and subjects to be ayding and assisting for the due obseruacion of this our graunte and priuiledge in all things according to the tenor of the same. In witness whereof etc. Witnes the quene at Westm the third day of Januarie.

per breve de privato sigillo etc.
Patent Roll. 3 Eliz., p. 13, memb. 34.

An Early Inventor.

The following petition, found among the Massachusetts Archives (CXXVIII. 60) at the State House, and published in the Boston Journal, suggests a wide range for the imagination. It bears no date, but as Andros was deposed on April 20, 1689, it must have been written before that time. Did Mr. Talbot, the writer, have in mind the application of steam to machinery? Or was it electricity that propelled his "engine?"

To Sr Edmond Andros, Knight Captain Generall & Governor in Chief over this his Majestys Territorys of New: E.

The humble petition of Christopher Talbot Turner in Boston Humbly sheweth

That whereas your petitioner with great pains & expence hath found out an Engine usefull for divers trades men as turners ropemakers smiths & all sorts of mills for corn sider sawmills & almost any thing that is to be done by wheels with saills & also hath discovered to make a boat sail against the wind & tide & sundry other things with more ease & expedition then hath bin discovered hitherto either in Europe or America, & whereas his Majesty & his royall Predicessors haue at all times been pleas'd graciously to Encourage all undertakings of this nature yt whosoever finds out any new engine or inuention profitable for ye common good to grant their letters patent for the sole use thereof.

Therefore yr petitioner is humbly bold & begs yt yr Excellency will be pleas'd to grant him yr letters patentes for ye sole use & improvement of the said Engine in these his Majesties territories of New: E. for 14 yeares (as is accustomed) & yt no other person shall make use of the same or any such like without yr petitioners consent.

who is in duty bound & shall for ever pray.

CHRISTOPHER TALBOT.

A trade journal with a thousand subscribers often has a greater number of readers of the sort the advertiser wishes to appeal to than the daily paper circulating a hundred thousand copies.—*Printers' Ink.*

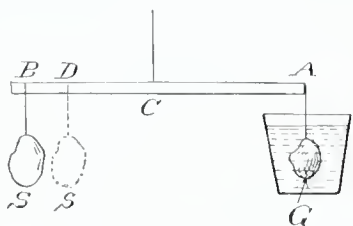
SCIENCE FOR YOUNG PEOPLE.

Conducted by E. P. LEWIS.

Archimedes was a mathematician and physicist who lived at Syracuse, in Sicily, more than two thousand years ago. Once Hiero, the king of Syracuse, ordered a goldsmith to make him a new crown of pure gold. When it was finished he suspected that the goldsmith had kept some of the gold, making up the proper weight with some baser metal. To Archimedes the king gave the task of discovering the cheat. For a long time the philosopher thought in vain on the problem. Chemical analysis was not known in those days, and there seemed no possible way of discovering the guilt of the goldsmith. But one day as Archimedes jumped into his bath some of the water overflowed, and it suddenly flashed across his mind that gold, being so much heavier than any other substance then known, would if placed in a vessel filled with water cause less to overflow than any other metal of the same weight. He was so overjoyed at this discovery that he did not wait to dress, but rushed home through the streets as he was, to try the experiment. He actually found that the crown displaced more water than an equal weight of pure gold, and so the goldsmith was convicted of fraud. This led to the discovery of the law, known as Archimedes' principle, that a body immersed in a fluid loses in weight by an amount equal to the weight of the displaced water, and this principle has been one of the greatest practical use. It is of the greatest importance in ship-building, and it is also used in obtaining what is called the specific gravity of a substance, which is equal to the weight of a piece of that substance divided by the weight of an equal volume of water. It is usually obtained by weighing the substance first in air and then in water. The former divided by the loss of weight due to the buoyant effect of the water (which by Archimedes' principle is equal to the weight of the displaced water) gives the specific gravity. This is often a useful way of identifying a substance, as we may see from the experience of Archimedes, for every substance has its own definite specific gravity.

* * *

It is remarkable what results may sometimes be obtained by very simple means. As an example of this fact may be mentioned a very good method of determining specific gravity with no instruments except a stick, a stone, a tape measure or rule, and some thread. Suppose you were travelling in some lonely place—prospecting for gold, perhaps—and should see a lump of something resembling the precious metal. Since gold is such a heavy substance, you could tell from the specific gravity of the lump whether it was gold or not; but how would you go about finding the specific gravity without balances and weights? This is the way to do it. Suspend a straight stick by a thread so that it is exactly balanced. Suspend the suspected gold G by another thread from one end and counterbalance it with a stone S near the other end. Measure the distances AC and BC (see the diagram). Then place a vessel of water under the lump G. The buoyant effect of the water will lighten it by the weight of the water displaced by it. In order to restore the balance it



will be necessary to move the stone S to the dotted position nearer C. Now by applying the law of the lever, that balance is obtained when the two bodies are at distances from the point of suspension C inversely proportional to their weights, it is easy to calculate by the simple methods of arithmetical proportion that the specific gravity of G is equal to the distance BC divided by the distance BD, so that, though we know the weight of neither G or S, we can determine the specific gravity of G.

* * *

Whenever electricity is produced in any way there are always equal quantities of opposite kinds separated, which have the property that two bodies charged with the same kind attract and two bodies charged with opposite kinds repel each other. In most cases there is no difference in the conduct of these two electricities, called positive and negative, except such as is shown by their action on each other, but there are a few strange exceptions. One of the most remarkable of these is seen in the action

of light, especially violet-colored light, on charged bodies. A negative charge will in a short time be completely dissipated by the light, while a positive charge is not affected. A piece of metal placed in the sunlight will become charged with positive electricity. This is due to the fact that the negative electricity which neutralized the positive is discharged by the light, leaving the positive electricity free. There is also a difference in the appearance of the discharges from the two electrodes of an electrical machine, especially when the discharge takes place through a tube with a rarefied gas in it. In the latter case the effect is very beautiful, the discharges varying in color with the gas used, and being composed of alternate layers of light and darkness, the cause of which has never been explained. Glass tubes containing rarefied gases called geissler or vacuum tubes, have sometimes been used for illuminations, but so far no one has succeeded in getting a very brilliant light from them. For garden parties and other occasions where a soft moonlight effect is desired, they would be very attractive.

Popular Scientific Errors.

Even those who have only an ordinary general acquaintance with scientific matters must often be astounded at the extraordinary statements which make the rounds of our newspapers. In nearly every case a little common sense, backed by the consultation of some recognized authority, would prevent these mistakes. One recent paragraph is to the effect that the Johns Hopkins University possesses the most expensive thermometer ever made, costing \$10,000. As a matter of fact, a thermometer costing \$10 is considered a rather expensive instrument, and it would be impossible to make one as costly as the one mentioned without encrusting it in diamonds, and this sensational statement, coming from no one knows where, caused much amusement at the university which was said to own the treasure. Recently a daily paper (and a very good one, too) had an editorial concerning some pretended discoveries as to the nature of gravitation. In a superior sort of way it asserted that Sir Isaac Newton was supposed to have discovered all about that subject long ago. The truth is that no one has the slightest idea of the cause of gravitation, though Sir Isaac succeeded in establishing its laws. In the same article Lord Kelvin (Sir William Thomson) was referred to in a way which implied ignorance, that only von Helmholtz can contest with him the honor of being the greatest living physician. It is also incidentally stated that the law of falling bodies is that the velocity is as the square of the space fallen through, whereas the reverse is true. And all this in one article!

Of course a literary or news editor cannot be an authority on every subject, nor can every paper employ a scientific editor, but every paper can at least refuse to publish as a fact every stray paragraph that floats around on the flimsy authority of "an eminent scientist," a "German professor," or "an electrical expert." Let the name of the authority be given in every case, and when an editor wants to write an editorial on any scientific subject let him rely more on standard text-books and encyclopedias and less on his imagination.

This seems a good place to put in a plea for that much over-worked word "force." We hear and read constantly of electricity, magnetism, and heat as forces, of the force of machines, and of the conservation of force. An educational journal, which ought to know better, recently published an editorial paragraph on "the conservation of force." Fifty years ago, before our ideas on some subjects had crystallized sufficiently to permit of accurate scientific definitions, such an expression would have been allowable, and was actually used by such men as Faraday and Tyndall, but always with a clear statement of the idea that they attached to the word. With our accepted definitions this use of the word force is grossly inaccurate, for force is that which moves or tends to move matter, and since action is always equal to reaction the algebraic sum of the forces of the universe is zero. There is then nothing to conserve. Those who make use of the expression mean to speak of the conservation of energy, or the capability of doing work, which depends upon both motion and force. It is likewise meaningless to speak of the force of a machine, those who do so generally meaning power, or the rate of doing work. For example, a machine is of one horse power when it can do 33,000 foot pounds of work every minute.

Some scientists are likewise to be blamed for encouraging erroneous ideas by yielding to the temptation to sacrifice accuracy for scenic effect. All such men deserve a rebuke like that lately administered by Professor Holden to certain astronomers who by their public utterances would lead people to believe that there is a scientific basis for all the drivel that appears about the probability that the planet Mars is inhabited. We may know something about this some day, but we certainly do not at the present time, and we are too willing to accept fan-

ciful speculations as sound theories—and it is just this that has brought the word theory into such undeserved contempt. A sound theory can rest only on demonstrated facts. It is really a part, and a very essential part, of our practical knowledge. Can a man be considered practically educated unless he has learned to use his brains as well as his hands? E. P. LEWIS.

Primitive Inventions.

The Patent Office and the students of primitive invention have been brought into interesting association by a series of specimens in the U. S. National Museum. These specimens come from the Pueblo Indian tribes of New Mexico, from Ancient Mexico, from Lapland and from the old collection of colonial apparatus made in Brooklyn. It is curious to find the same invention in so many places so widely separated, not only in distances but in the grades of their culture. The specimens referred to are a kind of harness or heddle used in weaving narrow belts or strips of cloth. The apparatus consists of a series of rods, twigs, reeds, bits of bamboo placed in a row near together and fastened to a transverse rod along the top and to a narrow transverse rod along the bottom. These vertical twigs have each a small hole burned through the center. In the Lapland specimen a block of wood like a thin board is cut out so as to leave the upper margin cylindrical and the remaining portion or tympanum is pierced with longitudinal saw cuts leaving a series of vertical slats not over a quarter of an inch wide and each one of these series has a hole burned through the middle. In the old colonial specimen this Lapland apparatus is attached to a long stem fastened to a block of wood serving as a basis.

In specification No. 334,320 in the United States Patent Office there is a drawing of a simple machine of this kind in which perforated wires take the place of the vertical slats. Except in the detail of raw material and the method of putting the thing together, the operation of all of these different inventions is exactly the same. The warp threads are passed through and between the horizontal series. One end of the warp is fastened either to a thread or to a stick held between the weaver's feet or to some other object; the other end of the warp is tied around a cylindrical block of wood which is attached to a belt passing around the body of the weaver, so that at a slight motion of the body forward or backward the warp can be tightened or loosened. The weaving is performed by lifting the heddle frame with the left hand. This brings one half of the warp threads above the other, acting like the harness of a loom. Any kind of a shuttle may be used to pass the weft between the warp threads and a flat stick like a paper cutter or a sailor's weaving sword will be used to beat the weft thread home. Then the heddle is pushed downward with the left hand which crosses the warp thread in another direction and the weft is brought back and beaten home. By this process very pretty patterns in belts may be made.

Now, the question at once arises "how did the Mexicans and all the Pueblo tribes of Indians learn to make this apparatus?" How does it happen that we find it also among the Lapps, who are Finno-tatar stock and in Brooklyn, to whose population it would not do for me to say that they belong to any savage tribe whatever? Finally, the apparatus has found its way into the patent office of Germany and the author has been able to secure for himself a patent upon a machine whose operations may be seen any day in the Mexican codices or among the Zuni Indians, or in use by the dark eyed peoples of Helsingfors. There are those who account for all similarities of this kind by saying that similar environments, opportunities and wants result in similar inventions and this is true in a general way but it is also indisputable that the more similar inventions are found to be in different parts of the world the greater is the evidence of contiguity among the people who possess these inventions. They have either been taught by the same people to practice the art or those who possess it are the descendants of a common ancestor from whom they have received it.

My purpose in sending this brief note to the INVENTIVE AGE is to ask everyone interested in textile matters to call my attention to this peculiar form of heddle or harness in any part of the world where they may have come across it. By associating the results of all studies it will then be possible to make a map, showing the distribution in time and places and to derive from this study some results with reference to solving the question whether each individual people has invented the apparatus independently or whether there has been some sort of contact between those who use it.

OTIS T. MASON.

INVENTORS will find information in THE INVENTIVE AGE, from time to time, worth many times the subscription price, \$1 a year, postage paid.



Advertisements inserted in this column for 20 cents a line (about 7 words) each insertion. Every new subscriber sending \$1.00 to THE INVENTIVE AGE will be entitled to the AGE one year and to five lines one time FREE. Additional lines or insertions at regular rates.

FOR SALE.—Street Car Motor; Patent No. 524,961, issued August 21, 1894. Correspondence solicited. Address, W. H. H. Stineman, Hicks Mill, Md., or Edward I. Clark, 110 St. Paul street, Baltimore, Md.

FOR SALE.—Patent No. 500,551; Combination Tool; 6 tools in one; has been thoroughly tested. Will sell entire right or let on royalty. For further particulars address James D. Barnett, Jenkins, Barry Co., Mo.

FOR SALE.—Or trade, Patent No. 524,065, issued August 7, 1894, on Journal Bearing, being a simple mechanism comprising an upper and lower member, the latter being provided with recesses for retaining balls, yieldingly supported therein for the shaft to rest upon. Undoubtedly the best journal bearing ever devised. A good opportunity for some one; sale or trade. Address, Daniel I. Lybe, Sidney, Ia.

FOR SALE.—My patent, No. 523,674; Conveyor. For particulars address Kaletan Michalowski, Pulaski, Wis.

FOR SALE.—State Rights to Patent Steam Flue Cleaner. Costs 25 cents to manufacture; hundreds sold in Ohio at \$10.00 each. Copies of recommendations furnished prospective purchasers. Address, T. W. McDougal, 50 Hamilton Ave., Chicago, Ill.

FOR SALE.—Patent outright, or state or county rights—patent granted Jan. 17, 1893, on Rain (or Mud) Skirts; sickness is reason for selling. Address, Patent Rain Skirt Co., 828 Vilet St., Milwaukee Wis. 10-11

FOR SALE.—Patent No. 489,554; A Milk Can which under air pressure prevents the milk from churning while in transit. Milk dealers should have this milk can. Address, James Cantwell, P. O. Box No. 409 Washington, D. C. 10-12

FOR SALE.—Patent No. 483,899; Improved Rice Huller; delivers the grain in separate bins according to size of grain, etc.; has many other improvements in hulling rice. Address, James Cantwell, P. O. Box No. 409, Washington, D. C. 10-12

FOR SALE.—Patent No. 524,279, Rocking Chair. Enables occupant, through easy push on the rocking foot or arm rest, to swing and rock combined. Adjustable parts. State and county rights for sale. Address John Koltmann, Leannette, Pa.

FOR SALE.—Cheap if patent is sold at once, patent No. 524,206. The greatest thing on the market; oil or liquid measure and filler; does away with measures and funnels. A fortune in it; unlimited sales. W. Keepers, Philadelphia, Pa.

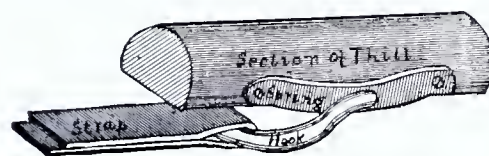
FOR SALE.—Patent No. 509,673; Step or Extension Ladder; sells on sight; change made in a moment; strong, light and durable. No ropes to wear out, nor springs to loosen. Town, county or state rights for sale. Exclusive territory given. Address the inventor, W. J. Osborne, Sonora, Steuben Co., New York.

FOR SALE.—Patent No. 522,202; Hand Truck; a pivoted toe-section connected thereto and means for operating it. The best hand truck ever invented. Will send copy of patent and specifications to any one desiring to investigate a good thing with a view to investment. Will sell patent on good terms. Address, Joseph Frenette, Chippewa Falls, Wis.

FOR SALE.—My patent, No. 523,388, anchor for check-row planter. Address, J. Valentine, Aplington, Iowa.

FOR SALE.—My patent, No. 522,695, dated July 10, 1894; Buggy or Bottle Washer, to connect with water hose. Will revolve a brush in applying water. Kindly give me an offer. Address C. A. Palmquist, 1725 1st avenue, W., Spokane, Wash.

FOR SALE or royalty, patented May 29, 1894, No. 520,612 Unique Thill Strap Hook or



Holdbac Fastener. Write Wm. Rice, Rome, 9-11

FOR SALE.—Patent No. 503,781, dated August 22, 1893; Novel Coal Elevator for Transferring Coal from Boats. Great saving in power. For further particulars address patentee, W. F. Austin, 328 Second street, Albany, N. Y.

FOR SALE.—Patent No. 524,358; Improved Doubletree. Will sell or place on royalty Geo. H. Talbot, Lansing, Mich.

FOR SALE.—Allen Braced Wire Fence. New patent using bridge principles. Strong and simple, state and county rights. Circulars on application. J. E. Allen, 53 Ross St. Williamsport, Pa. 8-9

FOR SALE.—Patent No. 520,460, issued May 29, 1894, Kitchen Cabinet; will sell entire right U. S., by States or divisions, cheap for cash or satisfactory terms. Best household article known; a novelty; can be made cheap. Address, Minnie S. Thomas, Waterville, Wash.

\$3,000 will buy 85 counties of the state of Ohio, which the purchaser can make \$15,000 by selling the counties. The patent is a Churn Dasher for the old up and down churn that sell for \$1; each patented last February. Wm. A. McMechan, St. Clairsville, Ohio.

FOR SALE.—Outright or State rights, patent granted September 26, 1893. No. 505,610, Improved Fruit Drier; thoroughly tested, good testimonials. Address, A. Jones, Pratt and President Sts., Baltimore, Md. 8-10

BUSINESS SPECIALS.

Advertisements under this heading 20 cents a line each insertion—seven words to the line. Parties desiring to purchase valuable patents or wanting to manufacture patented articles will find this a valuable advertising medium.

WANTED.—A patent on a Game Apparatus; will give half interest for some one to furnish the money to get patent, etc. If you want an interest in a good thing, write to J. W. Wright, Buffalo Gap, Taylor Co., Texas.

WANTED.—An agency for Philadelphia or New York, of one or more articles of merit. Can furnish some capital and have plenty of energy to push the sale of anything having merit. Address, giving full particulars, "S. A. P." care of Inventive Age, Washington, D. C.

WANTED.—A partner to furnish means for patenting an immensely profitable invention, a Slot Machine for Retailing Cigars. Machine receives all coins from a penny to a dollar, gives correct change, and produces cigars from box. For further particulars address David R. Huston, Hubbard, Minn.

WANTED.—To sell or place on royalty, Paper File; holds any number from 500 to 10,000. Any paper can be removed and replaced without interfering with any other. Best ever invented. Address A. Armstrong, Box 141, Noblesville, Ind.

WARNING.—Do not manufacture or use that French Hand Cultivator advertised in the Philadelphia Record May 24. It is an infringement on my patent, 443,366, advertised in Inventive Age, March 22, 1892, and in American Inventive Progress, Indianapolis, 1893. F. T. Neilsch, Houston, Texas.

WANTED.—A partner who will loan me \$100 for one year and take one-third interest in valuable and inexpensive invention. For further information address E. W. Barton, Windsor, N. Y. 9-10

WANTED.—To correspond with inventors with a view of selling State rights. Invention must be practice and useful. Address J. S. Busselle, care of Inventive Age.

Practical Suggestion for Irrigation.

TO THE EDITOR: Allow me, through your columns, to draw attention to a plan of irrigation suggested by me in the monthly report of the Agricultural Bureau a dozen or more years ago. The plan is not to divert the water from the rivers and spread it over the country, but to store it up, where it falls, upon the hills. Of course this scheme has no application to the arid regions of the west; but to the hill sides of the Atlantic states, and especially to the uplands of those states.

The plan is simply to make adequately large canals, or ditches, horizontally around the hill sides, and to give them no outlet. They should be large and deep enough to hold the water that falls during the heaviest rains. They should be, perhaps, 150 to 200 feet apart. The water thus stored would gradually percolate through the earth in dry seasons and nourish vegetation instead of washing away the soil and overflowing the streams as is now the case.

If the plan was adopted all along the banks of a stream, a further good effect would be to save the crops in the low grounds from ruin by the floods that now almost annually deluge them. A planter now considers himself in luck if the labor of the year upon his best lands is not destroyed in a night by an August freshet. This is particularly true of the south Atlantic states and the Gulf states as well. But it is true of every part of the hill country of the United States which is not embraced in the desert regions of the west.

Under present circumstances the rule has been, especially in the south, to clear a forest, cultivate it at most for two generations, and then abandon the uplands, which have been denuded of the soil by heavy rains which have plowed their way to the creeks and rivers in deep gullies. The torrents, not content with leaving desolation behind them, cause the streams to overflow and flood the low ground.

Another incidental good would result from the plan I propose—in saving the mills from being washed away by the freshets, while the ponds would receive a steady supply of abundant water to keep the mill-wheel running, a consideration which the people of every neighborhood in the uplands will appreciate.

The plan of irrigation I propose would cost money or labor; but the problem is worth considering. How many poor hill-side crops and how many drowned crops on the lowlands if substituted by good crops would pay for the ditches? DANIEL R. GOODLOE.

"Tips to Inventors."

This is one of the most instructive and useful works for mechanics and inventors. Its author is Robert Grimshaw, M. E., and the book, cloth bound, retails for \$1. THE INVENTIVE AGE for one year and "Tips to Inventors" will be sent to any address for \$1.50

AFTERMATH.

THE Homestead works of the Carnegie Company have resumed operations in all departments.

THE Lehigh Valley Railroad did the heaviest business in its history during the month of August.

THE Oresth Window Glass Factory at Anderson, Ind., has started up after an idleness of eight months.

THE next meeting of the National Electric Light Association, will be held in Cleveland, February 19-21, 1895.

EXPERIMENTS are to be made by the Army Ordnance Department with smokeless powder in the 8-inch, 10-inch and 12-inch guns.

VITRIFIED brick for street paving purposes, has been pronounced a failure in Cincinnati, where a thorough trial has been made.

SINCE the passage of the tariff bill the imports have been so heavy at Philadelphia, the wharves have been fairly choked up with goods.

HIRAM MAXIM, the inventor, declares that if given \$250,000 to build a practical air ship on his plans he will undertake to cross the English channel before August 31, 1895.

THE Erie Car Works at Erie, Pa., burned September 24. The loss is put at \$200,000; insurance, \$60,000. The works had not been operated for two years, owing to litigation.

THE Essic Printer is being brought forward again, this time at Cleveland. It is an ingenious machine which sends and receives messages in typewriter form, on a regular sheet.

A German, named Chas. E. Wemhefer, was arrested in Washington on the 30th inst., and examined as to sanity. He claims to be the inventor of a medicine that will electrify the world.

INVENTORS are pitching in again says Electrical Review. The hard times of the past 18 months suppressed a great deal of inventive genius. But it only slumbered and is now awake again.

THE INVENTIVE AGE is indebted to Eustace W. Hopkins, of the patent firm of Hopkins & Lenz, Berlin, for a translation of the new German Law for the protection of trade marks, dated May 12, 1894.

THE largest tin plate factory in the United States, has been located at Anderson, Ind. A bonus of \$20,000 was paid. The plant is to be what is known as a 12-mill concern and will employ 800 skilled workmen.

THE tin plate works of Saunders, Fielding & Bond, in Jersey City have been closed. Their roofing plates will hereafter be imported from Wales. Hughes & Patterson, a Philadelphia concern, has also closed down.

THE naval experts of the world are intently watching the great naval battles now in progress in the far east. Japan, though no match for her antagonist, China, in number of men, is her superior in every other respect. Upon sea or upon land, where the forces engage in battle, the one story is borne to the watchers of Japan's victories, China's humiliation and defeat.

COL. C. W. Taladee, of Freeport, Ill., an inventor of national reputation died from an overdose of morphine administered by his own hand on the 6th ult. During his life Taladee was granted over two hundred patents, many of them very valuable, among them being the Eclipse spring used extensively on buggies. He edited the first carriage trade journal ever published in this country. He leaves a widow who resides at Galveston, Tex.

PROF. HERMANN VON HELMHOLTZ, the celebrated German scientist who was recently stricken with paralysis for the second time, died at Berlin, Germany, on September 8. Professor Helmholtz came to the United States as the Imperial German Delegate to the World's Congress of Electricians, and was made Honorary President of the Congress. At the close of the Congress Professor Helmholtz visited New York and Boston, where he was made the lion of the hour.

Detectives Needed Here.

Superintendent Chas. Ainge, of the National Detective Bureau, Indianapolis, Ind., announces that two or three capable and trustworthy men are needed in this county to act as private detectives under his instructions. Experience in the work is not necessary to success. He edits a large criminal paper and will send it with full particulars, which will explain how you may enter the profession by addressing him at Indianapolis, Ind.

Disbarred.

Samuel J. Brown, Philadelphia, Pa., has been disbarred from practice before the U. S. Patent Office.

THE Commissioner of Patents gives notice that all solicitors, agents or attorneys who refer to him or any official in the Patent Office, for evidence of their official standing do so without authority.

"BUBIER'S POPULAR ELECTRICIAN" is the name of a monthly publication which contains a vast amount of valuable information on all electrical subjects. Its department of "Questions and Answers" will be appreciated by students and amateurs desiring information or instruction on any problem that may arise,

THE INVENTIVE AGE has made special arrangement whereby we can supply that popular dollar journal and THE INVENTIVE AGE both publications one year—for \$1.50.

Electric Flashes.

Philadelphia has 4,820 electric street lights, while New York boasts of but 1,300.

An electric line from Pittsburgh to Chicago, is one of the new schemes "talked" of.

An electric weed-killing device is the latest success on the Illinois Central railway.

Manchester and Winchester, two Ohio cities 25 miles apart, are to be connected by an electric railway.

Mr. K. J. Dunstan was elected president of the Canadian Electrical Association at its recent meeting in Montreal.

Queen Victoria will use electricity for cooking purposes. The necessary apparatus has been installed at Osborne, in the Isle of Wight.

For carelessly handling a motor car, Michael Lewis, motorman, of Newark, has been sentenced to one year in the penitentiary for manslaughter.

The new tunnel of the Baltimore & Ohio Railway in Baltimore is about completed and arrangements for running the trains by electric locomotives have been perfected.

A quilt has been devised with wires woven throughout it so that an electric current can be passed through the wires to heat them, thus diffusing a gentle heat throughout the quilt. This new quilt is called the thermogen.

It is said that Page, of Washington, in 1851, succeeded in obtaining a speed of nineteen miles per hour with a car carrying a number of persons and driven by a sixteen horse-power electric motor. This result is practically the same as that obtained from the most improved trolley cars of today, both in speed and power.

The United States Circuit Court of Appeals at Philadelphia, having declared void the "Feeder and Main" patents of the Edison Company, Electrical Review takes occasion to observe that the decision should not be taken as a blow at patents, but rather it should be considered as favoring accurate patents that do not claim too much.

A new electric fountain has been erected at Pittsburgh excelling in size and beauty the great fountains that delighted so many people at the World's Fair. The cost was about \$25,000. The basin of the fountain is 120 feet in diameter and the height of the central jet of water is 200 feet, fifty feet higher than that at the World's Fair.

Newspaper Reporters Wanted.

We are informed that the Modern Press Association wants one or two newspaper correspondents in this county. The work is light and can be performed by either lady or gentleman. Previous experience is not necessary, and some of our young men and women and even old men would do well to secure such a position, as we understand it takes only about one-fourth of your time. For further particulars address Modern Press Association, Chicago, Ill.

PREMIUMS TO SUBSCRIBERS.

Read the following offers to new subscribers:

OUR \$1 OFFER.

THE INVENTIVE AGE one year and two copies of any patent desired, or one copy of any two patents..... \$1 00
THE INVENTIVE AGE one year and a list of 50 firms who manufacture and sell patented articles..... 1 00
THE INVENTIVE AGE one year and Altograph map of the City of Washington 1 00
THE INVENTIVE AGE one year and a five line (35 words) advertisement in our "Patents For Sale," or "Want" column, one time..... 1 00

For \$1.

THE INVENTIVE AGE and any one of the following Scientific books:
How to Make Electric Batteries at Home, fully illustrated, by Edward Trevert.
Everybody's Handbook of Electricity, illustrated, by Trevert.
How to Make a Dynamo, by Trevert.
Practical Directions for Electric Bell Fitting and Electric Gas Lighting, by Trevert.
Elihu Thompson's What is Electricity?

OUR \$1.35 OFFER.

THE INVENTIVE AGE one year and Joseph Allen Minturn's famous book "The Inventor's Friend," indorsed by such high authorities, as Dr. Gatling, Clem Studebaker and others..... \$1.35
Book alone 50 cents.

THE INVENTIVE AGE one year and any one of the popular and instructive books as per offer in another column, under heading of "Popular Scientific Books,"..... \$1.35

THE INVENTIVE AGE one year and any one of the "Excelsior Edition of Standard Poets," mentioned elsewhere in this magazine..... \$1.35

THE INVENTIVE AGE one year and a copy of "Picturesque Washington," 200 pp., 136 illustrations, Stilson Hutchins' famous book, former price \$2, sent to any address in the United States..... \$1 35
See another column for other offers.

OUR \$1.50 OFFER.

THE INVENTIVE AGE one year and Robt. Grimshaw's famous book "Tips to Inventors"..... \$1 50
Address all communications to

THE INVENTIVE AGE,
Washington, D. C.

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE, which keeps inventors posted in the art in which they are mostly interested. — The full address of any patentee, and number of patent found below sent to any address on receipt of one 2-cent stamp. — We will send, postpaid, to any address, printed copies of any U. S. patents, with specifications and drawings, upon receipt of 20 cents for one copy; 35 cents for two copies; 50 cents for three copies. — (See premium offer elsewhere in this issue.) — Address THE INVENTIVE AGE, 8TH AND H STS., WASHINGTON, D. C.

LIST OF PATENTS

GRANTED FOR INVENTIONS,
AUGUST 28, 1894.

Adjustable chair. C H Knight, L A Chi-
chester and D S Relyea.
Advertising cabinet. A Bourlier.
Alarm lock, electric. J Slater.
Andiron. J G Grogan.
Animal trap. K A Dunnbeck.
Automatic brake. W P Wigley.
Axle, vehicle. C Burns.
Baling press. R H Gray.
Barometer, aneroid. D Logan.
Bearing, lubricating. S Straker.
Bed brace. W H Moffitt.
Bell, electric. R Varley, Jr.
Bell, electromagnetic call. J J Geary.
Belt fasteners, for bending teeth of sheet
metal. W O Talcott.
Belt fasteners, machine for making sheet
metal. W O Talcott.
Bicycle handle, adjustable. R C Whyne.
Bicycle saddle. L M Devore.
Bicycle signal. P E Matthes.
Blocks, manufacture of hollow. J B Gran-
jon and C Bellon.
Boiler. T A Myers.
Boiler tubes, apparatus for removing in-
crustation from. D P Anthony.
Boom for holding and towing logs or timber.
W F Stevens.
Boring tool. F H Richards.
Bottle 2. F E Blaisdell.
Bottle corking machine. A A Pindstoffe.
Bottle stopper. J Rosenfeld and S W Mackey.
Bottle washer. M E Donally.
Bowling alley. W H Wiggins and T H
Vanderhoef.
Bracket or rest for work benches, etc. A
Griesemer.
Breast supporter. M Thack.
Brick press. L F Gerding and E C Harri-
son.
Brooder. D O Brunner.
Brush, fountain marking. A G Carling.
Butter package cover. O W Stearns.
Button clasp, collar. J E Wolgenuth and
G S Engle.
Buttons to garments, machine for attaching.
D A Carpenter.
Buttomer, combined shoe and glove. I E
Mushette.
Cakes, etc., with icing, machine for coating.
J H Mitchell.
Can heading machine. J Gould, Jr.
Can washer. M Letson and F Burpee.
Car coupling. R Bennett.
Car coupling. T Seyfried.
Car coupling. C T Thomas.
Car coupling. A J Walker.
Car fender. W F S Robinson.
Car fender. C E Struck.
Car fender and brake, combined. H W
Evans.
Car loading machine. T Beck.
Car lock. C E Buckley.
Car safety guard, street. W H Rice.
Car, stock. J M Burton.
Car, street. W F S Robinson.
Car switch operating device, railway. B B
Breed.
Cars, etc., device for preventing accidents on
street. A McKelvie.
Cars, safety fender for tram, electric or cable.
H S Robins.
Carbon filaments, manufacture of. T A Ed-
ison.
Carding machines, feed alarm for. W W
Gordon and T F Pye.
Cards, pocket receptacle for. R Senner.
Carpet holding and sewing apparatus. E B
Allen.
Cash register and indicator with electric
alarm attachment. J B Nesbit.
Cement walks, forming. W J Haddock.
Chain drive. J O Brown.
Chair. A Burkholder.
Chimney guard. C N Partlow.
Churn. J A Howard.
Cigarette machine. A P and E P Scarra-
manga.
Circuit breaker. C C Chesney.
Circuit closing device. J J Geary.
Clock, chiming. S Willock.
Clothes clamp. B P Reilly.
Coagulant. J Van Ruymbeke.
Coal drill. J Collier.
Compensating device. C Cade.
Cooker, steam. J E Hill.
Cuff holder. J J Duket.
Cultivator shovel. J W Bartlett.
Cultivator, sulky. R V Dorsey.
Cultivator, wheel. D Mott.
Cultivator, wheel. A Plagman.
Curling iron. H Smith.
Currents, method of and apparatus for
changing period and phase of alternating.
C S Bradley.
Curtain hanger. M Gair.
Cycles, device for alternating speed of. R
Schweers and C Fuchs.
Decapping or recapping implement. W A
Wright.
Dental or surgical chair. E P Stiles.
Dental tool guard. A E Peck.
Desk or table, writing. C and L Borm.
Dry battery. J I Solomon.
Dumping device. T S Miller.
Dye, black azo. A Weinberg.
Dynamite. H A Callahan.
Ear trumpet. J Prince.
Egg case or shipping crate, folding. C B
Proctor.
Elastic fluid under pressure, apparatus for
generating. E Laugen.
Elastic or plastic composition. J Pattigler.
Electric light wires, rosette for. D J Cart-
wright.

Electric machines, means for mounting and
driving dynamo. A L Riker.
Electric motor. A V Meserole.
Electric switch, fluid operated. J J P Clariot.
End gate. F Setcinger.
End gate and scoop board fastening device.
J H Moore.
Expansible bolt. W M Levering.
Fabric, machine for making slit and wire.
E F Guess.
Farm gate. J D Pine.
Fence post. R B Robbins.
Filter and trap, sand. J Blumer.
Fire alarm apparatus, electrical. E W Jung-
ner.
Firearm handle. J H Wesson.
Fireplace heater, open. F Hinds.
Fishpole holder. P Burke.
Flushing apparatus, automatic. F Walker.
Foot warmer portable. I Boyd and B Har-
desty.
Forceps. E Whisson.
Fruit basket and crate. R E Morey.
Fruit or hard press. C F Meyer.
Furnace grate. S P Dobbins.
Furnaces, blast feeding apparatus for. E
Cartwright.
Garbage receptacle. H A Heidsieck.
Gas, process of and apparatus for making.
W F Brown.
Gas purifying apparatus. G E Gilman and
J A Richter.
Gate. R O S Bosworth.
Gate. A D Neil.
Gate. T B Taylor.
Grain separator. H Bailey and W L Gilson.
Grate. E U Scoville.
Gun, gas operated. W Mason.
Handle. L M Devore.
Harrow disk sharpener. M A Cameron and
G T Dawson.
Hoop mill attachment. F L Clark.
Hydrant. C Q Hayes.
Hydraulic motor. J H Boyd.
Ice making apparatus. J Price and M C
Bannister.
Ice covering device. L Pusey.
Ice shaver. I L Egnor.
Ice tongs. J Heffner and A E Disher.
Insulator. L W Bradley.
Iron into steel, converting cast. W N Tag-
gart.
Key fastener. F E Allen.
Knit fabric and method of an apparatus for
producing same. W R Cartledge.
Knit goods, seam for cut. S Borton.
Lamp, central draft. F Rhind. (Reissue).
Lamp cut out, incandescent electric. W F
Smith.
Lamp, electric arc 2. E Thompson.
Last. J Howard.
Lath, cooper's. H Schmidt.
Leather cutting cylinder. E T Marble.
Lifting jack. T Maxon.
Lifting jack. F Wiser.
Lock. B S Miles.
Locks, guard for bolts of spring. J W Gray.
Locomotive. C Hagans.
Low pressure alarm. G Heffner.
Lubricator. G Binder.
Lumber register. W H Emerson.
Macerator for fruit, etc. O E Davidson.
Magazine camera. J Tascher.
Manhole cover. T P Greger.
Marble, making artificial. P A Moreau.
Match. P Lorenz and R Wuppermann.
Measure and funnel, combined. B G Reese
and D B Gade.
Measuring and drafting apparatus, garment.
M Horn.
Meat tendering machine. J Hehsdorfer.
Middlings purifier. E B Whitmore.
Milling machine, nut. J H Brown and H.
W Smith.
Milling machines, universal head for. F
Kemp Smith.
Miter box. K L Hyller.
Molding, dry sand. W C Wood.
Monkey wrench, compound action. S M
Friede.
Monument. W Ohaver.
Motion, mechanism for converting pedal.
T Baker.
Mowers, platform raking attachment for.
A B Miller.
Mowing machine 2. Knowlton.
Mowing machine cutter bar. E I Peaslee.
Nailing machine, duplex. G A Ambler.
Name plate attachment. C W Ruth.
Oar, bow facing. B F Kinsey.
Oar lock. G Garton.
Oil burner attachment. B Cross.
Oyster dredge. D E Powers.
Package or barrel, knockdown. C Richard-
son.
Packing box. E Nolon.
Packing, piston. W Goodman.
Packing, steam. J H Weitmyer.
Paper hanger's roller. W Jones.
Peeling table, fruit. F M Anderson.
Pencil sharpener. W P Mayes.
Perfecting press, flat bed. J L Cox.
Permutation lock. W B Ward and J H Mor-
ris.
Photographic camera. J Tascher.
Piano action, upright. K V Barnekov.
Pipe fastener. T C Belding.
Pipe or nut wrench. H M Glines.
Pipes, manufacture of. G W Fox.
Planter and cultivator, combined potato. J
M Blake.
Pole coupling, carriage. W J Kauffman.
Pole, vehicle. J B Struble.
Powdered materials, apparatus for agitating
and blending. J S Detwiler.
Powdered materials, apparatus for blending.
J S Detwiler.
Printing press. J L Cox.
Pulley, guide. G H Geyer.
Pumps, means for operating. J V Hogan

and D McGrath.
Railway signal, electrical. W F Seymour.
Railway switch. W Douglas.
Railway switch stand. E M Robinson.
Railway tie. N Benjamin.
Railway track liner. D Richardson.
Railway trains, water service system for.
J McNaughton.
Railways, electric time signal for. R D
Patterson.
Razor sharpening machine. C L Thornton.
Refrigerating machines, lubricating. S S
and C W Miles.
Refrigerator. F Kochler, Jr.
Reverberatory furnace. M J Murdoch.
Ring frame spindle. E Gessner.
Rock or ore breaker. R D Gates.
Rolling mill. J Fawell and J Hemphill.
Rolling mill. J Hemphill, J F Wilcox and
J Fawell.
Rolling mill appliance. J M Price.
Roofing plate, metal. R Friedel.
Rope driving apparatus. J H Hoadley.
Rotary steam engine. S C Shepard.
Rule, plumb. F Holt.
Safety lock. G Bergevin.
Sandpapering machines, polishing cylinder
for. F E Schmitt.
Sash balance. S B Sutton.
Saw, shop 2. W W Holmes.
Screw, archimedeian. J Dyson and R H
Williamson.
Search lights, tilting device for. P J Daugh-
erty and W F Litten.
Sesaw. M Mayer.
Sewing machine. E B Allen.
Sewing machine. S Borton.
Sewing machine. Z T French and W C
Myer.
Sewing machine. E Murphy.
Sewing machine needle threader. T R
Fischer.
Sewing machine thread cutter. S Borton.
Sewing machines, guide for carpet. E B
Allen.
Sewing machines, guiding and pile control-
ling device for carpet. E B Allen.
Shaft support, vehicle. J A Wheatley and
S M Worthington.
Shafting, straightening machine for. W
Copley and H E Hogson.
Sheet metal pipe. J Schmidt and J Weitzel.
Shells, ejector mechanism for exploded. D
M Lefever.
Shingles and headings, machine for cutting.
A B Ireland.
Shipping cases, knockdown rack for sup-
porting. J H Bowley.
Shoe. H A Jewelsky.
Shoe uppers, seam hammering device for.
A I Schmiedl.
Skate, wheel or roller. J G A Kitchen.
Smoke consumer. H F Ray and A Dewey.
Snow plow. M L Stewart.
Soap pressing or stamping machine. E El-
bert.
Sole channeling knife. W H Hilsley and J
Cook.
Spark arrester. J McMurrin.
Specific gravities, separating materials of
different. N W Holt.
Spinner, organize. J Duffy.
Split link center pin hook. W Hodge and
J Pearson.
Spooling or winding machine. J M Parker.
Springs, means for limiting tension of driv-
ing. P Wendelboe.
Squirrel exterminator. T R Barney.
Stacker, pneumatic. G A Raasch and H
Fahrmeier.
Stairway. J Fallerton.
Stamp, combined printing and cutting. B
B Hill.
Stamps, etc., device for protecting and pre-
venting re-use of revenue. D C Harrison.
Station indicator. A C Allyn.
Steam or hot water boiler. W M Mackey.
Steam separator. P Goan.
Stone sawing apparatus. M L Ritchie.
Stone structures, filling for joints, fractures,
etc., of. C H Slicer.
Storage battery 2. H K Hess.
Stove, gas. C H Miller.
Stove, hot air. H J Wattles.
Stove, hot air heating. C S Dean.
Street sweeper. W A Green.
Stud, lacing. A Mathison.
Studs, making lacing. F B Manville.
Sulky. F S Stoddard.
Surgical splint. L A Denther.
Switch operating mechanism. W H Zerbe.
Syringe. S F Yount.
Target trap. W C Donaldson.
Telephone transmitter. J and H M Good-
man.
Telephones, coin controlled lock for. P
Cooke and J L Harley.
Thill or pole support, vehicle. J Badret.
Tile construction for wooden buildings, fire-
proof. J A Flint.
Timepiece, repeating. C Hahlweg.
Tine, wheel. R M Keating.
Torpedo boat, submarine 2. G C Baker.
Tower, observation. M F Smith.
Toy building block. E von Leistner.
Toy cannon 2. C A Bailey.
Train robber alarm. M Z Levy.
Trolley. N W Haskins.
Trolley wire switch and crossing. N W
Haskins.
Trousers stretcher. H A Saltzman.
Truck. C W Schwartz, Jr.
Truck, farm. J L H Baker.
Truck, stove. A Thiele and C F Fox.
Tubular boiler. C Alfonso.
Turbine, steam. N G K Husberg.
Valve, safety check. J M Foster.
Valves of steam engines, actuating. A De-
combe and P Lamena.
Vane, electrically operated wind. L Brad-
ley.
Vapor burner. W H Wilder, E A Thissell,
J A Lannert and W R Jeavons.

Vine fastener. E J Fuller.
Vise, hand. C E Billings.
Vise jaw. T W Vane.
Wagon body, milk. G B Marx.
Washing machine. F D Harding.
Watches, mainspring barrel for. A N
Gauthier.
Watches, roller jewel protector for. A N
Gauthier.
Water closet for railway cars. S S Herrick.
Water elevator, momentum. J M Allen and
A J Welcker.
Water purifier. H Cassard.
Water purifier 3. H Woods.
Water wheel. P S Buckminster.
Weighing machine, grain. I G Jones.
Wheel. S Garwood.
Wheels to shaft, means for fastening. J C
Fiester.
Window. S C Taylor.
Window attachment. J and C Dietz.
Window or door button. S C Black.
Window screen. J W Clark.
Wooden shovel. I Lemieux.
Wrench. J A Reynolds.

PATENTS GRANTED SEPT. 4, '94.

Advertisements, apparatus for displaying.
H E Turpin.
Air brake mechanism. J B Kundschen.
Amalgamating apparatus. S L Prieststone.
Amalgamator. A C McDonald.
Autographic register. J W Dick.
Autographic register. O C Reeves.
Bearing for gyrating shafts for stone-break-
ers or other machines. P W Gates.
Bearing for gyratory shafts or other ana-
logous mechanism. C L Carman.
Bed, sofa. H Whiteside.
Berths, construction of. W W M Williams.
Bicycle support. F C Hallbach.
Bit shank and chuck. M L Andrew.
Blisters, poultices, etc., protector for. I M
Hemsteger.
Boilers, mechanism for flanging manholes
of. W H Smith.
Bottle. H A Hayden.
Bottle. J Walton.
Bottle, self-sealing. H P Roberts.
Bottle stopper. J Rogginger.
Bottles, jars, etc., stopper for. J J Valey.
Bottles, machine for washing and removing
labels from. H W Wills.
Buckle. H W Hoeff.
Buddle. J Radermacher.
Buggy top rest. J Heilrath.
Burglar alarm. P Byrne.
Button and fastening therefor. J Bernstein
and M. Kohn.
Calendering machine. P Dillon.
Camera shutter. J E Blackmore.
Caoutchouc mixing mill. G Watkinson.
Car brake. E Cliff.
Car brake, electromagnetic. R T Murray
and C M Allen.
Car coupling. L O Beebe.
Car coupling. E Buckley.
Car coupling. J C Hurley.
Car coupling. F Kerlin.
Car coupling. G A Seidel.
Car fender. H W Eaton.
Car fender. T Ross.
Car, safety express. B J Tegethoff.
Car signal. F Nicholson.
Cars, controlling device for electric railway.
W H Conrad.
Carpet sweeper. W Newbigging.
Cart, dumping. W T Wood.
Caster. S Hamm.
Casting journal boxes, apparatus for. P W
Gates.
Cellulose, apparatus for the manufacture of.
C W Flodquist.
Chamfering and crozing machine. H Ol-
sen.
Cheese press. J L Helmer.
Chuck. Z B Coes.
Churn and butter worker, combined. A M
Bingham.
Cigar lighter, electric. A C Albertsen.
Clamp device. J R Hime, Sr., and W B
Cox.
Cleat or belaying pin, releasing. A V T
Sabroe.
Cloth cutting machine. A Long.
Comb cleaner. J Cooper.
Combining machines, dabling brush appara-
tus for wool. I Rushworth.
Concealed battery. L C Demain.
Conduit, underground. A Segade and D J
O Regan.
Corn popping apparatus. A Lafrance.
Cotton separator and distributor, combined.
H A Paine.
Cream separator, centrifugal. A Malmros.
(Reissue).
Current motor, alternating. O Dahl.
Cut out, electrical. A Rockoff.
Dental plates, making. J Spyer.
Dipper. E C Baughman.
Disinfecting apparatus. C T Cox.
Disinfecting device. F L Dolbeare and A
E Keating.
Door securer. O B Hoffman.
Door spring and check, combined. R
Adams.
Draft equalizer. M and A Sattley.
Drill rope protector. J H Koch.
Dust separator or spark arrester. T Lee.
Duster or polishing cloth, woven. D Scott.
Dye, azo, 2. P Julius.
Dye, blue. C Duisberg.
Dye, blue basic. J Schmid and J Bachelut.
Dye, blue black disazo. J Schmid.
Dyeing machine. J M Collins.
Dynamo, steam turbine. J F McElroy.
Electric battery. L Roscher.
Electric light wires, rosette for. C N Ham-
mond.
Electric lighting system and apparatus. E
Thomson.

Electric lock. F Apitz.
Electric machine, dynamo. J F McElroy.
Electric machines, system and apparatus for
control of. E A Sperry.
Electric switch. G F Card.
Electrical current director. J F McElroy.
Electrical distribution, system of, 2. T C
Coykendall.
Electrolytical decomposition, apparatus for.
A Sinding-Larsen.
Electromagnetic tractile device. C M Allen.
Elevator safety device, 3. W P Kidder.
Elliptic spring. W H Hansell.
End gate, wagon. G E and R Stewart.
Envelope machine. J and E R Corbett.
Evaporating pan. T Crane.
Excavating machine. C H Parker.
Expansible bit. E Ford.
Fabric and forming same. G Laveissiere
and G Chamont.
Farm gate. J Woods.
Faucet. F H Burrill.
Faucet. W D King.
Feed water heater, 2. H G Keasby.
Feed water regulator. H Bowman.
Feeder to prevent scale, automatic. J V
Mottet.
Fence machine. M Gleason.
Fence post. H G Thompson and C Wain.
Fence, wire. G M Depew.
Filing block. E A Brush.
Flat iron heater. A J Myers.
Flooring clamp. J W Smith and F J Per-
kins.
Fluid fuel burner. W E Vernon.
Fodder tying device. I H Henley.
Fumigator. H Hoffman.
Furnace. R H Yeoman.
Furnace pipe. H McMillan.
Garment hook. J J Ziegler, Jr.
Gas, apparatus for manufacturing hydrogen.
P Yarrington.
Gas engine. W W Grant.
Gas engine. F C Olin.
Gear, variable speed. E E Wolf.
Gin saw sharpening machine. J A Rogers
and D C Burns.
Grain binder knitter. W N Whiteley and
W Bayley.
Grinding mill. J J Seeman.
Grooving tool. W C Bloomer.
Gun carriage, disappearing. A Cuthbert.
Gyrating crusher. C L Carman, E E
Hanna, and P W Gates.
Gyrating crusher. A J Gates.
Gyrating crusher. P W Gates.
Gyrating screens, etc., sealing, lubricating,
and bearing support for. P W Gates.
Hame hook. W W Miller.
Harrow. J C Freeman.
Harrow, double disk. H Tallman.
Harvester bundle carrier. M A Keller.
Harvester, corn. G W Packer.
Harvester, corn. M Sorenson.
Harvester, corn. H Weller.
Harvesting machine cord knitter. M A
Keller.
Hatch. E M Christian.
Hay carrier. W London.
Head cutting machine. W Nier.
Headlight reflector. M O Ainslie.
Hides, etc., machine for dressing. W
Evans.
Hides or skins, apparatus for treating. I
Vaughn.
Hinge, blind. A C Siekman.
Hinge, spring. G A Payson.
Hitching strap. J H Vallean.
Hoisting apparatus. H A Pedrick.
Hoisting or lifting apparatus brake. A
Bolzano.
Hoop for boxes, etc. J S Dinkel.
Hose coupling. N W Williams and E B
Seely.
Hub, wheel. S Johnson.
Ice cream freezer. F H Fisk.
Ice cream freezer. C Gooch.
Incubators, heat regulator for. H R Davis.
Intestine cleaner. W F Duncker.
Invalid's table and desk, combined. F G
Koehler and H G Hartmann.
Joint for articles of wood. W E Gage.
Journal bearing. J Cornelissen.
Key fastener. J F Varrell.
Knitting machine, circular. Z Lecaisne.
Lamps, handpiece for portable electric. A
Rockoff.
Latch for sliding gates. T N Fisher.
Lawn sprinkler. C Widrig.
Leveler, road. N S Monroe.
Life saving garment. O Hanson.
Lock. A O'Keefe.
Locomotive, 2. B F Taylor. (Reissue).
Locomotive ash pan ventilator. E H Mar-
shall.
Loom shuttle, carpet. W P Kirkpatrick.
Loom temple. T Sykes.
Mail box. O P Johnston.
Mandrel, expanding. H Berner.
Meat tenderer. J W Francke.
Mill. C Bonnefond.
Molding appliance. J B Neff.
Money recording and receipting machine.
C Fisher.
Monkey and pipe ratchet wrench, com-
bined. S M Friede.
Motor controller, electric or other. E A
Sperry.
Mower, lawn. S P Graham.
Net landing. F A Pearsons.
Nozzle, spray. H F Neumeyer.
Nozzle, universal. W K Crawford.
Nut lock. F R Bodley.
Odometer register. A O Shields.
Oil extracting apparatus. J Meikle, Jr.
Organs, tubular key and pneumatic valve ac-
tion for. P Bagstrom.
Oven, bake. J J Pfenniger. (Reissue).
Package carrier. S W Babbitt.
Packing for piston rods, steam. J J Walker.

Packing, rod. E A Bryant.
 Padlock, master key. J Roche.
 Pan making machine. J S Birt.
 Paper box, 2. R P Brown.
 Paper box. J Witte, Jr.
 Paper, etc., holder for. T Bodley.
 Paper roll holder. W H Clarke.
 Paper weight and letter file, combined. G L Collins and M Keegan, Sr.
 Parasol runner. A G Snell.
 Pen rack. H D Pierce.
 Photograph mount. D R Hanawalt.
 Photographic paper, sensitized. W H Prestwich.
 Photographic print mounter. H A Lesne and D D Duuklee.
 Photographic view finder. J J Hicks.
 Piano action, hammer rail for. R H Comstock.
 Pill machine. A Colton.
 Pipe corrugating and seam grooving machine, sheet metal. T C Belding.
 Pipe drilling device. J E Feely.
 Pipe, ratchet and monkey wrench, combined. S M Friede.
 Planetarium, coin operated. J M Sullivan.
 Planing and boring machine, combined. J P Burnham.
 Plant holder. S W Babbitt.
 Planter, corn. G W Packer.
 Plow, wheeled. H Lindstrom.
 Pneumatic dispatch system. O Konigsow.
 Pneumatic dispatch tubes, receiving box for. L G Bostedo and E A Fordyce.
 Pneumatic dispatch tubes, receiving box for. E A Fordyce.
 Poison distributor. F Splittstoser.
 Polishing machines, cylinder adjusting mechanism for. F E Schmitt.
 Potato digger. G W Phipps.
 Press, 2. V D Anderson.
 Press. J E Delarue.
 Propeller, screw. J D Muller.
 Pump, plumber's suction and force. J H Lawless.
 Pumps, etc., power mechanism for. J Wagner.
 Pumps, puppet valve for pistons of air or gas. W F Garrison.
 Punch, belt cutter and pliers, combined belt. J A House.
 Railway signaling by means of detonating or explosive signals. H Brooklehurst.
 Railway switch. J L La Driere and S I Stone.
 Railway signal. F G Smith.
 Railway system, conduit electric. O A Enholm.
 Railway system, electric. F B Batt.
 Raisin seeding machine. C L Spencer.
 Reading stand. O Nelson.
 Reamer. C D Marsh and A D Hermance.
 Refrigerator float. F Schubert.
 Riding, amusement, and instructing device. W J and F E Gordon.
 Rippling knife. E Van Valkenburg.
 Roof templet. H W Nichols.
 Rope grip. C N Blood.
 Rotary engine, 2. F M Mackey.
 Rotary motor. A Clement.
 Rotary steam engine, compound. W G Florence and J H Bennett.
 Roving frames, adjusting means for belt shifting mechanism of. M Campbell.
 Sad iron. H B F Barker.
 Sanitary closet. H H Kendrick.
 Sash fastener. W S Grundy.
 Sash fastener. N W Mottinger.
 Saw, frame. N H Shaw.
 Sawmill guard. J C Horstmeier.
 Sawing machine. W H Geisler.
 Sawing machine. E and L Hedderick.
 Scale, beam. F M Smiley.
 Screens, making ornamental. I E Foltz.
 Scrubbing machine. H M Patterson.
 Seal, spring box. D E J Wellhoefer.
 Seam for metal troughs or tanks. H N Hill.
 Seaming machines, fluting attachment for. H Schaake.
 Separator. G O Draper.
 Shaping machine with milling attachment. F J Thomas.
 Sharpener, scissors or knife. W E Ginn.
 Sharpening device, tool. W H Simmons.
 Sheet metal vessels, socket for. C L Wagnandt.
 Ships, etc., construction of. L M Lincoln.
 Shoulder brace. W Greenshields.
 Sight testing apparatus, coin operated. B Green.
 Snap hook. T Lacey.
 Soap drying apparatus. M Andrae.
 Soap press. M J Palmer.
 Soldering iron, self heating. T W Eversole.
 Soldering machine, can. C M Symonds.
 Sounding apparatus, submarine. W M Prather.
 Sower, force feed broadcast seed. G M Ditto.
 Spike. A Assorati.
 Spindle bearing adjusting device. G O Draper.
 Spinning and twisting frames, thread receiver for. G W Knight.
 Spinning and twisting spindles, load equalizer for. J H Northrop.
 Spinning spindles, sleeve whirl and load equalizer for. G O Draper.
 Spring bending machine. W and W J Bauer.
 Stadia rod. E C Stout.
 Staple driving implement. J Blakey.
 Stave cutting machine. W Nier.
 Stave frame. F O Havener.
 Steak tenderer. J H Nickles, Jr., and G F Shirley.
 Steam boiler. H G Keasbey.
 Steam boiler. A Normand.
 Steam trap. V D Anderson.
 Stencil sheets, manufacture of. J Brodrick.
 Stone breaker, gyratory. P W Gates.
 Stone breakers, inclined diaphragm of gyratory. P W Gates.
 Stone crusher. J J Brewis.
 Stone crusher. C L Carman.
 Stone crusher. P W Gates.
 Stone crusher heads to shafts, method of and means for securing. P W Gates.
 Stone crusher, portable. C L Carman.
 Stone crushers, frame and hopper for gyratory. A E Hoyt.
 Stone, molding box for artificial. R Avenarius.

Stone or ore crushers, concave for. I M Van Wagner.
 Stove for burning gas. D McDonald.
 Stovepipe fastening device. C A Parks and A Goodell.
 Stovepipe shelf. C N Johnson.
 Street clearing apparatus. A E Trevithick.
 Switch lock attachment. L Dedel.
 Switch stand. B F Driever and J W Mixon.
 Target trap. W A Wildhack.
 Telegraph call, district. W H Garven.
 Telephone pay stations, automatic toll box for. H C Root.
 Thill coupling. W B Clark.
 Thill coupling. C L Halstead.
 Thill coupling. J A Ketting.
 Tickets, machine for making pin. T Moore.
 Tinning iron castings. A Schaag.
 Tire, bicycle. E R Thatcher.
 Tobacco pipe. J F Mallinckrodt.
 Transplanting plants, apparatus for. L Humbarger.
 Tray rocking machine. J Hess.
 Trolley wires, overhead switch for. H M Greenwood.
 Trousers supporter. E I Pyle.
 Truck, sweet car. F E Canda.
 Trunk. G Crouch.
 Tubes, apparatus for wiping galvanized. T L Thomas and J B Hillman.
 Tubes, manufacture of solder lined seamless. L L Burdon.
 Tug, thill. A I Brundage.
 Type writing machine. A H Huth.
 Umbrellas, identification attachment for. H D Hamilton.
 Valve. R M Dixon.
 Valve, automatic relief. F Schreidt.
 Valve drain cap. W K Connors.
 Valve, piston. S O Jones.
 Valve reseating machine. W Bruner.
 Valve, thermostatic. A M Butz.
 Vapor burner. M E Campney.
 Vapor burning apparatus. A J Lindemann.
 Vault, garbage. W Ostermeyer.
 Vegetable cutter. M Josephson.
 Vise, box making. W O Kaaner and A V Tyler.
 Wagon body clamp. A L White and S J Dean.
 Wagon brake. B F Pascoe.
 Wagon, dumping. J McBride.
 Washboard. C C Hartung.
 Washboard. J G Schneider.
 Watch protector. A Sarumark.
 Water alarm, frozen. W Humberstone.
 Water closet. A M King.
 Water closet seat attachments, bearing for. J H Stevens, Jr.
 Water wheel. F M Bookwalter and W W Tyler.
 Water wheel. A F Sparks.
 Weather boarding. F H Burrows.
 Weather strip. R M Wilson.
 Well boring apparatus. A Weil.
 Wheel washing device. M Arbuckle.
 Wheels, machine for counting teeth of cog. F C Stamm.
 Windmill towers, brace lock for. M J Alt-house.
 Window screen. S Abbott.
 Wire drawing machine. G B Lamb.
 Wire stretcher and splicer. O Marshall.
 Work box. S F B O'Leary.
 Wrench. A Assorati.
 Wrench. M Wenger.

PATENTS GRANTED SEP. 11, '94.

Acid, etc., apparatus for condensing nitric. E Hart.
 Advertising device. R D Knight.
 Air brake for cars. J F Voorhees.
 Album, cabinet. J M Ray.
 Alcoholic liquors, preparing and making fermented. J Takamine.
 Amalgamator. J Jett.
 Ammonia, apparatus for making anhydrous. P J McMahon.
 Annunciator, electric. H C Thompson.
 Arm rest, self adjusting. W A Kirby.
 Armature for dynamo electric machines. R Eickemeyer.
 Armatures in dynamo machines, winding for drum. R Eickemeyer.
 Antographic register. W Assheton.
 Balancing rotating parts, device for. G W Rymes.
 Baling press. G W and G A Davis.
 Bearing, ball. J W Howard.
 Bearing for clothes wringers. A R Sauters.
 Bedstead, adjustable. T A Martin.
 Bedstead, invalid. G E Gorham.
 Beehive. J F Sheffield.
 Beer dispensing apparatus. D Leacock.
 Bell, bicycle. A A Page.
 Belt fastener. A Mills.
 Bicycle. E W Scott.
 Bicycle gearing. V Cruser.
 Bicycle lock. S C Hone.
 Bicycle, self supporting attachment for. F H Kinder.
 Blind hanger and guide. N Saltmarsh.
 Blotter holder. A Weinandy.
 Blowers, packing box for rotary. W W Wainwright.
 Body shield. W F Keogh.
 Boiler furnace. E Boileau.
 Boiler or steam generator. C D Mosher.
 Boiler setting. C V Kerr.
 Boiler tube attachment. C W Whitney.
 Boot or shoe. H Briggs and C Dancel.
 Boot tree. W J Yapp.
 Borings at bottom of deep waters and in tide-ways, means for making. A W Palmer.
 Bottle stopper. C N Brisco.
 Battling machine. E Stahl.
 Box lifter. H Eddishaw.
 Box top. L Miller.
 Buckle, trace. L L Booth.
 Buggy top support. W W Kruttsch.
 Buildings, constructing. H Kleiu and E Rowenbagen.
 Bung. J Baemle.
 Button attaching machine. W E Elliott.
 Cabinet, copy book. R E Ashbrook and M H Ingram.
 Calcimine. G S Adams.
 Capsule. R P Hobbs.
 Capsule pin and capsule. R P Hobbs.

Car attachment, express. F W Kuehler and F W Marten.
 Car coupling. E N and J J Byers.
 Car coupling. A S Edey.
 Car coupling. J Reed.
 Car coupling. L Showalter.
 Car, dumping. G T Morris.
 Car, dumping. E A Trapp.
 Car fender. S A Darrach.
 Car fender, street railway. A J Hollingsworth and J A Weaver.
 Car, hand. J McMurrin.
 Cars by electricity, system of lighting and heating. M Moskowitz.
 Cars, combined brake and electric switch for street railway. G Brown.
 Carbons for electric lamps, manufacture of. T A Edison.
 Card teeth, method of and means for manufacturing. J Platt.
 Carpet sweeper. H W Ru Ton.
 Carriage body, convertible. C Klaubner.
 Carriages, runner attachment for children's. G Nadeau.
 Cart, child's. F C Hannahs.
 Cash register and indicator. C L Lilleberg.
 Casket fastener. J C Edward.
 Caster. L B Denton.
 Cattle guard. L Hills.
 Chop grading machine. J A McNulty.
 Churn. E H Baugh.
 Churn. S D Fry and J R Hamilton.
 Churn. J H Rouse and C A Schonhoff.
 Clipper, hair. M G Gillette.
 Clock, electric. F L Gregory.
 Clock synchronizing mechanism, electric. E Ayres.
 Cock, ball. J N Stevens, Jr.
 Cold storage building. A I Dexter.
 Composition of matter. J E Summers.
 Condensing apparatus, steam. W Webster.
 Cooking utensil. R M Shaffer.
 Copper, process of and furnace for smelting. A O Vienna.
 Cotton picker. A Levedahl.
 Crate cover, etc., shipping. M Backstrom.
 Culinary vessel. D C Wood.
 Cultivator. H M Burdick.
 Dam. F H Bainbridge.
 Delivery apparatus, coin freed. L Cecchi.
 Dental apparatus. F M Osborn.
 Dental pellet. G B Richmond.
 Dental pellet machine. G B Richmond.
 Dental plugger. A A Noyce, Jr.
 Diastatic enzyme, making. J Takamine.
 Dissolving, leaching and filtering. Method of and apparatus for. J Storer and B T Lacy.
 Doll, mechanical. D S McElroy.
 Door closing device, automatic. C Winckhofer.
 Dose cup and bottle, combined. M O Turner.
 Doubletree, vehicle. S J McDonald.
 Draft equalizer. E L Thomas.
 Draw bar guide. H W F Jaeger.
 Drawer and shipping box, combined. J G Walsh.
 Drawer case. D E Hunter.
 Dredge. E S Bennett.
 Drier. T Crane.
 Drilling machine. N Rimmel.
 Drum, heating. H I Grennell.
 Drum, heating. W H B Lyons.
 Dry closet and urinal system. W W Ensign.
 Drying machine. J K Proctor.
 Dumping boat. W McMahon.
 Dynamos, means for equalizing electromotive force of. M Moskowitz.
 Electric machines, self adjusting brush for dynamo. W L Bliss.
 Electric motor. J S Losch.
 Electric switch. G Baehr.
 Electric transformer. C S Bradley.
 Electric wire fastener. H C Fricke.
 Electrical distribution, system of. J F McElroy.
 Electrolytic apparatus. E Andreoli.
 Embroidery, removing background from. G Hauser.
 Engines, electrical igniter for gas or hydrocarbon. P A N Winand.
 Explosive compound. B C Pettingell.
 Fan, electric. C Wachtel.
 Fan, ventilating. J D G Thompson.
 Fastening device. F W Starr.
 Faucet. C H Dunton.
 Fence, wire. D Garst.
 Fertilizer distributor. L Roat.
 Fiber drier. F G and A C Sargent.
 Fifth wheel. S K Paden.
 File for index cards. A Dom.
 Filling machine. F Wallis and G Galbraith.
 Fire kindler. E Ludde.
 Flexible joint. A Campbell.
 Flour bin and sifter. C F Burnap.
 Flue cleaner, boiler. P H Enoch.
 Flushing closet, ventilating. G D Curtis.
 Furniture joint, school. G M Bennett.
 Game counter. J G Ward and J W Ball.
 Gas engine. J McGeorge.
 Gas motor, ammonia. P J McMahon.
 Gold washing and separating apparatus. J B Irvin.
 Grain meter 2. F F Kanne.
 Grate. E Boileau.
 Grinder, feed. T Cascaden, Jr.
 Grinding machine. H B Beirsto and H S Beckwith.
 Gun barrels, device for attaching magazines to. L L Hepburn.
 Harrow, reversible overlap disk. T B Montgomery.
 Harvester. S D Locke.
 Harvester. B F Stewart.
 Hay carrier. P A Myers.
 Heating and ventilating apparatus. W W Ensign.
 Heating furnace. L Jackman.
 Hinge. J B Knittel.
 Hinge, shutter. A O Elzner.
 Hinge, spring 2. A A Page.
 Hitching device, rope. E F Parker.
 Hoisting device. W E Tretheway.
 Hoisting drum. H Bolthoff.
 Hooks and eyes, machine for making and carding. A D Major.
 Hop cleaning machine. R J and J P Mackison.
 Hose coupling 2. W Martin.
 Hulling and cleaning machine. C E Lipe.
 Ice handling implement. D C Ryder.
 Ice machines, freezing plates for. C S Booth.

Insole for slippers. A Sessler.
 Insulating support, bus bar. A B Herrick.
 Journal box 2. W W Wainwright.
 Kettle, cooking. B C Sabin.
 Kitchen cabinet. J L Swink.
 Knob attachment. T E Wardwell.
 Lacing hook or stud for shoes, gloves, etc. G S Pearson.
 Lamp. R M Dixon.
 Lamp, electric arc. H E Bradley.
 Lamp, electric arc. S L Campbell.
 Lamp, electric arc. A B Roney.
 Lamp stand and reflector, incandescent. G F Klemm.
 Lamp, spark shield or protector for electric arc. W M Tompkins.
 Latching device for double doors. I Johnson.
 Lath, metal turning. S W Putnam.
 Lead, making white. E Waller and C A Sullin.
 Leather, making artificial. H Krum.
 Lifting jack. L Foix.
 Lifting or log jack. E and A G Hayford.
 Lightning arrester. A L Courtwright.
 Logging apparatus. A W Brown.
 Loom shuttle. J H Morin.
 Manual records and indicator. H Cook.
 Mash, alcoholic ferment. J Takamine.
 Match making machine. L H Montross.
 Medicinal food and preparing sauce. E O Taffin.
 Milling machine. E J McClellan.
 Miter cutter. C E Smith.
 Money changer's case. W H Staats.
 Mop wringer. C A White.
 Motion, mechanism for taking up lost 2. J W Boynton.
 Motion, mechanism for taking up lost. E H Parks.
 Moto, preparing and making. J Takamine.
 Music boxes, spring motor for. G Otto.
 Newspaper holder. A B Smith.
 Nut, self locking. A A Brown.
 Oil can. J C Roth.
 Oil can, siphon. I Brokaw.
 Oils, desulfurizing mineral. A Sommer.
 Oils, purifying sulfur compounds of mineral. L O Helmers.
 Oven. J Erben and M M Koch.
 Oven, baker's. F Duhkopf.
 Paper can. G H Partlett.
 Partitions, iron frame for fireproof. A M Houston.
 Paving block. J H Amies.
 Pen, fountain. E M Gorden.
 Pencil. G R Sandell.
 Pessary. J A Hurdle.
 Petroleum, refining. H A Frasch.
 Photograph flash lamp. A Hensley.
 Photographs, apparatus for developing, etc. E F Macknick.
 Photographic camera, series. M Mayer.
 Planter, combined corn and cotton. W C Sanders, Jr.
 Planter, potato. F Gaunt.
 Planter, potato. M F Myers.
 Plow. R E Hopkins.
 Plow. H A W Smith.
 Plow, submarine. J H Dalton.
 Propelling vessels, hydraulic method of. J Widmer.
 Pulp grinding machine. A Karger.
 Pump. H Mortensen.
 Pump. V S Reed and D Apgar.
 Pump, automatic hydraulic. T A Walther.
 Pump, oil well. S C Turner.
 Punches or presses, means for operating. E B Stimpson.
 Punching machine. E B Stimpson.
 Puzzle. M A Klein.
 Rail brake. G Sands.
 Railway, electric. H E Rider.
 Railway, gravity. A Witschold.
 Railway signal carrier. N A Fans.
 Railway signaling apparatus, electrical. P Schwenke.
 Railway system, electric. C S Bradley.
 Railway tie, metallic. E L Taylor.
 Railway trolley, electric. E Dawson.
 Railways, conduit system for electric. W G Creighton.
 Refrigerator and beer cooler. L Leyendecker.
 Refrigerator drip trough. C W Hinrichs.
 Refrigerator shelf. J Schambrne.
 Register. W M Dyas.
 Ring making machine. F Mossberg.
 Roaster. N H Jensen.
 Roll holder. W H Lewis.
 Rotary engine. J F McElroy.
 Sales slip. F J Shepherd and M B Flagg.
 Salt evaporator. T Crane.
 Sash fastener. F F Unkrich.
 Sash holder. T C Maris.
 Sash, removable window. J Lehnbeuter.
 Satchel, sheet metal. H Macarthy.
 Saw tooth, insertible. R Marquart.
 Scale, price. H E Knottnerus.
 Seed hulls and separating lint and hulls, detaching lint from cotton. J P Burnham.
 Sewing machine. W S Clark and M H Willis.
 Sewing machine. J H Way.
 Sheet separating and printing machine. C Reising.
 Skinning knife. J A Foster.
 Sower, hand seed. W R Bowen.
 Spinning frame separator. G A and G O Draper.
 Spinning mule attachment. F H Lewington.
 Spoke and tie tightener. J M Hawley.
 Sprinkler head. J H Dixon.
 Station indicator. S N Ashmore.
 Stone working machines, attachment for. R D Field.
 Stoves or ranges, grate and fire chamber for. G G Wolfe.
 Street sweeper. H Mueller, Jr.
 Street sweeper. W L Tobey.
 Stringed instruments, device for producing overtones in. F X Audet, Jr.
 Sugar, means for and method for converting starchy material into. J Takamine.
 Switch operating device. G A Fulford.
 Taka koji ferment and preparing and making same. J Takamine.
 Taka koji, preparing and making. J Takamine.
 Taka moyashi, preparing and making. J

Takamine.
 Tea and sealing packages, device for sampling. T E Wardwell.
 Telephone call system 2. E T Gilliland.
 Tenoning machine. W H Bennett.
 Tenoning machine. E B Hayes.
 Thermometer. H W Mauger.
 Thrashing machine. P Swenson.
 Timepiece striking mechanism. J W Dorr, Sr.
 Tires, manufacturing casings or sheaths for pneumatic. G Knadler.
 Tobacco fillers, machine for treating heavily sweetened. T W Helm.
 Top, spinning. D W Long and H H Walsh.
 Traction engine. P A N Winand.
 Trolley pole connection. M R Mahon and J M Crane.
 Truck, hand. J J Healy.
 Tubular boiler, circulating. J A Bernard.
 Tubular boiler, circulating. E L Martin.
 Turning machine, wood. F W Heuser.
 Type. G W Weaver.
 Type writing machine attachment. A H Merriman.
 Undertaker's trimming table. W Fitzgerald.
 Unloading device. W T Flapiken.
 Urinal. A Sahlstrom.
 Valve, automatic ventilating. W W Varney.
 Valve base, pneumatic. J F Ives.
 Valve for compound direct acting engines, steam actuated. H C Sergeant.
 Valve gear. W F Cole.
 Valve, safety. M McNeil and R Kohlhepp.
 Vegetables from night frosts, protecting growing. S Lemstrom.
 Vegetation, means for promoting. S Lemstrom.
 Vehicle for spreading sand. A Laflamme.
 Voltmeter, recording. F D Gould.
 Wagon brake. M H Madsen.
 Wardrobe hook. D W Tower.
 Watchmaker's tool. A H Fleming.
 Water lag stopper, hot. D E Martin.
 Water closet. A T Booth.
 Water closet. C R Schmidt. (Reissue).
 Water closet and urinal. W W Ensign.
 Watering trough, automatic. T L Regester.
 Weft fork. O Piper and J E Newton.
 Whist, apparatus for playing duplicate. G A Bisher.
 Wick raiser. F Rhind.
 Wind mill power transmitter. C E Williamson.
 Wire stretcher. J M Myers.
 Wire strips or the like by electrodeposition, manufacture of. R D Sanders.
 Work holder. S D Erb.
PATENTS GRANTED SEP. 18, '94.
 Account keeping device. E McCulley.
 Acid, making nitric. M Prentice.
 Adjustable bracket. A W Browne.
 Air brake coupling. W Borbridge, T Fraser and W Prenter.
 Air brake, automatic lock for. W Mable.
 Air or gas compressor. H A Barber.
 Aluminous cake and making same. J V Skoglund.
 Antirust ware. D M Wells and A Q Allis.
 Axles, antifriction device for. A M Crooker and R Weinhold.
 Bag making machine. W H Kerr.
 Baling press. J A Spencer.
 Band cutter and feeder. V C Bailey.
 Band cutter and feeder. C H Hill.
 Barrel. W H Cadwell.
 Bearing, roller. B D Tabor.
 Bed, sofa. A L Gillen and A Godfrey.
 Bicycle. V Belanger.
 Bit stock. F M Hay.
 Blotting pad. A Forander.
 Blower. T Kitson.
 Blowing engine or compressor. W E Good.
 Boiler furnace. E Boileau.
 Boiler furnace, smokeless. P J Bode.
 Boiler furnace, steam. O D Orvis.
 Bolt. J W Sammis.
 Books, blotter attachment for check. M R Toland and J F Conkey.
 Boot or shoe polishing machine 2. E O Bicknell.
 Boring machine. G W Pringle and W Brodie.
 Bottle closing device. A W Schroeder.
 Bottle rack. J E Goerger.
 Bottle stopper. G L Matthews.
 Bottle washer. T Wendling.
 Bottling apparatus. A A Pindstoffe.
 Brake mechanism, automatic fluid pressure. H Guel.
 Bridle bit. M Lesser.
 Bucket. A Mitchell.
 Bunting machine. S W Winslow.
 Buggy boot. W J Kaufman.
 Buggy cushion. F Long.
 Burning garbage, etc., apparatus for. J C Anderson.
 Burning garbage, etc., method of and apparatus for. J C Anderson.
 Cable grip for logging and other purposes. G Gagnon.
 Cadium bisulfite liquor, making. M L Griffin.
 Calculator. F G Nelson.
 Car and air brake coupling, combined. S W Summers.
 Car coupling. W F Drew.
 Car coupling. N S Duggan.
 Car coupling. F S Hitchcock.
 Car coupling. J O Miller.
 Car coupling. J J Schairer.
 Car, express. McMorell and R M Ferrer.
 Car, freight. J Rhoads.
 Car gate. A M Black.
 Car, railway passenger. J Krehbiel.
 Cash register and indicator. J P Cleal.
 Cereals, preparing. W Onderdonk.
 Chain, conveyer. J Dick.
 Chain, drive. J H Mitchell.
 Chain, galvanic. F Fritsche.
 Charcoal, treatment of animal. J A Dubs.
 Check attachment. R Sears.
 Check, conductor's. A Ross.
 Cheese curds in a continuous manner, producing. E G N Salenius.
 Chromium, electro deposition of. E Placet and J Bonnet.
 Cigarette machine, continuous. A L Munson.
 Cistern cleaner. J W Hawke.
 Clippers for wood or hair, construction of mechanical. P Ashberry and W Barnes.
 Clothes drier. L W Pond.
 Clutch, friction. R T Wingo.
 Coal or coke fork. J Kreitz.
 Coal or rock drilling machine. E Carnduff.

Coffee pot. J Tobin.
Coffin hand lift. W H Pope.
Collars, machine for forming turndown or rolled. R N Martz.
Condenser, surface. F M Wheeler.
Converter, multiphase. H O C E Wagemann.
Cores for casting, apparatus for manufacture Core for casting hollow cylinders. F Gandy.
of. W H Drake.
Cotton openers, etc., dust or cleaning trunk for. J C Potter.
Cotton picking fingers, driving mechanism for. A Levedahl.
Crib, folding. J S Mackie.
Crupper fastener. C E Barker.
Cultivator, pulverizing. H Strasser.
Cup head or piston packing. J F Pruden.
Curtain attachment, window. J M Freeman.
Cut off mechanism. W W Wallace.
Cylinders, securing teeth to. J H Dunbar.
Dental chair. E B Cushing.
Dental plates, forming. G W Trapiagen.
Depth gage. A G Hollister.
Dial transmitter. F Pearce and J Broich.
Disinfecting device. W Moackler.
Disintegrating fibrous plants, machine for. A L Evia.
Display holder. A L Stone.
Dock, dry. M Moeser and R Erpel.
Door check. F A Phelps.
Door lock, sliding. W H Kaldreider.
Dough raiser and fruit drier. S Q Duncan.
Draft equalizer. H Sturm.
Dress shield. E M Welcker.
Drying kiln 2. W G Galloway.
Drying machine. P C Hewitt.
Drill head. A J Cooper.
Drill rod grab. W H Wisherd.
Dust arrester. A Vollm.
Electric cut off. E E Hersh.
Electric generator. H O C E Wagemann.
Electric indicator. C J Coleman.
Electric machine, dynamo. D H Wilson.
Electric motor. A W Meston.
Electric motor. E Thomson.
Electric switch. L Winterhalder.
Electrical connector. J B Henck, Jr.
Electrically operated register for barrels, etc. H J Bang.
Elevator shaft gate. T G Lamb and J H McClure.
Engine shaft rotation indicator. J W Ray.
Envelope, safety. C F Molly.
Envelopes, adjustable perforator and cutter for business. P H Flynn.
Excavating and amalgamating machine, combined. A W Robinson.
Excavator. J P Griffin.
Explosive engine. H F Fraser.
Fat, reducing animal. J Lister.
Feed regulator. J A McAnally.
Feed water for steam boilers, purifying. C Stickle.
Feed water heater. F W Lycett.
Fence clamp, wire. G E Boots and W O Eakright.
Fence fastener. J Harris.
Fence, wire. E D Barling.
Fiber drying apparatus. W Saulmann.
Filter. S G Delham.
Fire extinguisher. C J L MacLeod.
Fire extinguisher and alarm, automatic. J E Musschmann.
Flagstaff. T J Murray.
Football. W R Thomlinson.
Foot wear. F T Kee.
Fuel support or gate. E Fales.
Fuse for shells, time. M Dreger and A Wratzke.
Gas, apparatus for the manufacture of hydrogen. H M Lovejoy.
Gas apparatus, water oil. H Fourness.
Gas meter, prepayment. W N Milsted.
Gas under pressure, vessel for containing. W W Pope.
Gasmeter, coin controlled. W Alexander and W E Thompson.
Gate. J L Harris.
Gearing for heavy machinery, driving. O C Wolf.
Glove wrapper. T A Bail.
Gold or silver from ores, apparatus for and process of extracting. P Dauckwardt.
Governors, speed recorder of motive power engine. E Lachmann.
Grain separator. W Reid.
Grate, combined dumping and shaking. E Fales.
Grinding mill. W N Hartshorn.
Grinding mill. S Schwarzenberger.
Grinding or facing machine. L L Lamb.
Guns, cartridge stop for magazine. G T Thornhill.
Hand bag, lady's. A Hinkel.
Handle bar, adjustable. A O Very.
Harvester. G G Hunt.
Harvester, corn. W S Osborn.
Harvester, cotton. E Whiting.
Harvester elevator. A Stark.
Hat blocking and band cutting machine. C M Shell.
Hay and stock rack, combined. E N Avery.
Hay carrier track. J W Provan.
Hay rack, hay stand, and stock wagon, combined. W P Kimbrell.
Hay stacker and loader, combined. W H Rouse.
Heating furnace, water. A Anderson.
Hinge, flush lounge. J W Brown.
Hinge, furniture. J H Stiggelman.
Hinge, spring. A A Page.
Hoisting apparatus. L Rosenfeld.
Horseshoe. M E Poupard.
Horseshoe, jointed. J B Hagne.
Horseshoe, sectional. M E Poupard.
Horseshoe, segmental. M E Poupard.
Hose coupling. A L Bailey.
Hot air furnace. W Ryan.
Hot air heater. W Heckert.
Ingot extracting apparatus. H Aiken and F W Wood.
Ingot extractor 2. H Aiken.
Inkstand. C B Smith.
Inlaid work for decorative purposes. H A Cousins.
Joint support, continuous metal. W H Drake.
Journal bearing. D J Davis.
Journal bearing, adjustable. L Hollingsworth.
Journal box. H B Williams.
Jugs, etc., mount for. W Fryer and F A Coles.
Knife clamping or securing device. H S

Buckland.
Knives, making. G M Griswold.
Knitted doll. S E Holmes.
Lacing hooks, machine for setting. I E Chandler.
Ladder tower, extensible. H Hoffmann.
Lamp, incandescent electric. D J Cartwright.
Lantern. J J Shull.
Last, shoe. A T and J Harper.
Lasting pinchers. F Eckert.
Lifting jack. S S Joy.
Limbs, coaptating pad for artificial. J F Rowley.
Lock case. E E Magovern and T Scanlan.
Loom Jacquard mechanism. B H Gledhill.
Loom pattern mechanism. J Hill and E Smith.
Lubricator. W W Dashiell.
Machine base, adjustable. J J Wood.
Measurer cutter, wall paper border. E Hoke.
Measuring and marking machine, fabric. A H Sutton.
Measuring or packaging fabrics, speed regulating attachment for machines for. R W Watson.
Mechanical movement. W W Beaumont.
Milk cooler. L N Lean.
Milking machine, cow. W B Bland.
Molder's flask. F Morris.
Motor governor. J Dow.
Mowing machine. G Beckman.
Nail machines, wire feeding device for. C W Richards.
Neckwear pin. H B Rich.
News-papers, reviews, or other printed material, classifier for. H Wetzel.
Non conducting coverings, fastening for. P Carey.
Nut and bolt lock. J E Garvin.
Oil distributor for ships, gravity. J Ericson.
Oil or gasoline can. T W Alexander.
Ore concentrator. L Look.
Package. M J Meeker.
Paper sheets, case for. J J Yeates.
Pavement block. L Weinman.
Pen rack, stand, and case, combined. W J Hunter.
Pencil sharpener. C F Wickland.
Pipe coupling. J D Anderson.
Pipe wrench, chain. J H Newell.
Placards, etc., machine for bordering. M Funke.
Plane iron. W F Kellet.
Plating one material with another. T A Edison.
Plow. J L Aldred.
Plow. T J Kelley.
Pneumatic tool. J G Carlinet.
Pneumatic tube fisher. W C Bloomer.
Pocket-knife. D A Stiles.
Pole, vehicle. E Clark.
Pressed steel seat. G H Wadsworth and H W Avery.
Pressure regulator, fluid. M S Hopkins and C H Dickson.
Printing press. D Maurer.
Protactor. C H Chum.
Pump. S M Chase.
Pump, air. R C Baibour.
Pump, centrifugal. H A Barber.
Pump, oscillating. A Geiger.
Pump, steam vacuum. G H Zschech and W H Smulding.
Pump valve, steam. J Farley.
Railway bond, electric. D D Book.
Railway cattle guard. P L Brady.
Railway rail joint. L C Zollinger and W H Patten.
Railway switch, automatic. C Dietz.
Railway switch, street. J C Jacobs, A Keil and J H Roemer.
Railway systems, substructural support for. J D Reed.
Railway time signal. A C Gordon.
Railway tracks, etc., vegetation burner for. E Dawson and J O Thomas.
Refrigerator. G A Greene.
Rendering tank. A White.
Revolving chair. J M Morgan.
Rifles, method of and dies for the manufacture of band forgings for military. C E Bailey and G F Bowen.
Rolling mill. G G McMurtry and L G Stitt.
Rolling mill, tube. C G Larson.
Ropeway clip, elevated. W R Wiggins.
Saddle, riding. J M Martin.
Sate bolt work. E W Fowler.
Safety gate. F W Young.
Salicyl anilid. S Radlauer.
Sand band. W M Farr.
Sash fastener. C Rolles.
Sash fastener. J Seadler.
Sash fastener. J O Sharp.
Sash fastener. D B Wesson.
Sausages into links, machine for forming. H Lefebvre.
Saw and resaw, combined band rip. E C Mershon.
Saw attachment. R McLane.
Scholar's companion. F D Martin.
Scrubbing machine, floor. W W Head.
Seal. E J Brooks.
Seal, snap. E J Brooks.
Secondary electric battery. C Therye and A Oblasser. Reissue.
Sewing machine. S H Wheeler.
Sewing machine, shoe. G R Pearce.
Shaft support, vehicle. C H Knight.
Shaper, razor. P J Caesar.
Shingle strips, machine for manufacturing supplementary metallic. C H Dana.
Show top. S S Goldman.
Signal apparatus. J P Coleman.
Signal apparatus. G L Thomas and E C Seward.
Smoke consuming apparatus. C W Morris and L Goodwin.
Smokeless furnace. C Murray.
Snow shoe, folding. H Bremer.
Soap, inserting floats in cakes of. W Berry.
Sounds, apparatus for collecting, concentrating and distributing. S D McKelvey.
Speed of pulleys, etc., mechanism for regulating. J Redding.
Station indicator. E Miller, Jr.
Statistics, machine for compiling or tabulating. H Hollerith.
Statistics, machine for tabulating. H Hollerith.
Steam boiler. D Connelly and C E Schafer.
Steam boiler. J J Tonkin.

Stereotyping press. W J Egan.
Stoker, mechanical. T R Butman.
Stove, caboose or other. J Spear.
Stovepipe attachment. L Reaser.
Street sweeper. F W Dessau.
Stringed instrument. J Connery.
Swing. C E Hobbs.
Switch apparatus. J G Schreuder.
Syringe, vaginal. J M Lamb and J C Hardy.
Table. J W Carver.
Tanning composition. J B Hodges.
Tap of faucet. M P Schetzel.
Telephone transmitter. H L Baldwin.
Tile, illuminating. C W Mark.
Tile, illuminating. J W Mark.
Tire, pneumatic. J N Goldbacher.
Tool clamping device. H S Buckland.
Tool securing device 2. H S Buckland.
Top. W A Dunlap.
Transit, pocket. D W Brunton.
Trolley wire finder. E Gale.
Type distributing machine. L K Johnson.
Umbrella. W D Kimball.
Umbrella handle. J Gilbert.
Valve 2. J A Blair.
Valve for steam engine, rotary. F Lester.
Valve gear. J W Sargent and R H Rice.
Valve mechanism for hydraulic elevators. W F Cole.
Vehicle seat corner iron. C C Field.
Velocipede brake. J H Hendrick and A H Fay.
Velocipede, ice. S Young.
Velocipede saddles, means for supporting. C De Rossetti.
Veneer cutting machines, quarter log holder for. M D Williamson.
Vessels, apparatus for raising sunken. E B Petrie.
Wagon beds or wire stretcher, machine for moving. R H Irvine and A T Anderson.
Wagon brake, automatic. D W Lee.
Wagon, mail. J H Martin.
Wagons, self closing roller top for transport. H Muldberg.
Washstand and water closet, combined. A A Leyare.
Washing machine. D R Borneman.
Watch case pendant. A N Gauthier.
Water closet. J F Wolff.
Water closet coupling 2. J H Savill.
Water closets, connection for broken. A W Ayling.
Water gate, automatic. G Gattenbrunner.
Wave motor. C A Merritt.
Wells, construction of oil. O Fay.
Wires for metal disks or plates, machine for forming. F H Howe.
Wood cutting machine 3. W Merrill.

PATENTS GRANTED SEP. 25, '94.

Advertising shipping tag. A S Terrill.
Air ship. D Hurlbut.
Anchor or supporting plate 2. J Pirk.
Animal trap. J Ross.
Animal trap. C A Snow.
Atomizer. F B Giesler.
Auger, post hole. F W Mosure and I Warner.
Backwater trap and valve. S W Hallock.
Bag. W H Field.
Barrel pitching apparatus 2. G Schmitt.
Barrels, follower for brine. C C West.
Basin and valve operating mechanism therefor, set wash. J H Stevens, Jr.
Basin trap. J Marquis.
Bearing, ball. P Davies.
Bedclothes clamp. H L Jensen.
Bell, call. W Storm.
Belting, manufacture of round leather. F E Druschky and L A Schjerling.
Bevel. C H Scott, C H Harvey and B R Scott.
Bicycle support. W H Scott.
Binders, shield for knotted fingers of. W T Schenck.
Boiler. H H Kelley.
Boiler furnace. J Grogan.
Boiler scaling preventives, water pressure feeder for. T B Smith.
Books, cover for memorandum sales slip. W M Kinnard.
Botching machine. A Werner.
Box fastener. A W Jones.
Bread or cakes, apparatus for the manufacture of aerated. J Childs.
Buggy tops, lever attachment for raising or lowering. J B Aton.
Building mat, composite. D Neale.
Bung stopper and bung bush. S Schlagen and I Neumann.
Camera shutter. G A Waters.
Cans, pneumatic tester for. W B Page. (Re-issue).
Car brake. S G Wilber.
Car brake, automatic. J C Deyerle.
Car coupling. M McPhail and F Kopicke.
Car coupling. H A Winternight.
Car grip slot brake, cable. J T Marlin.
Car guard. J H Jennings.
Car register, street. W D Forbes.
Car switching device, street. J Brautigam.
Car, vestibule. W F Richards.
Cars, testing indicator for electric railway. T Stebbins.
Card clothing, apparatus for setting teeth in. M Duesberg Delrez.
Card for eyeglass chain. E J Fisher.
Card holder. G T Beeland.
Cash register. W W Johnson.
Cash register, indicator, and recorder 3. P J Landin and F L Walker.
Centrifugal screen. E R Dudley.
Churn. W P Bending.
Churn. J W Coyne and J A Shannon.
Cigar lighter. G W LaBaw.
Clamps, manufacture of metallic binding. E Heynen.
Clocks, apparatus for adjusting the beat of pendulum. F Kroeber.
Coal screen. G W Cross.
Coin controlled machine. W Reeves.
Conductor support and insulator. D N Osyor.
Conveyer. C W Miller.
Cotton sack carrier. C L Johns.
Counting grape cuttings, grape roots, etc., machine for. F M Kidder.
Coupling link. A Lamplough.
Curling iron heater for lamps. H C Goodrich.
Curtain rod support. H Benoit.
Cyanids of alkaline metals, making. C T J Vautin.
Decorating glass or other surfaces. J Bndd.
Dalton tool sterilizing apparatus. Z T Sailer,

Detachable hook. H A DeRaisnees.
Distilling crude turpentine, apparatus for. R O Carter.
Distilling spirits, apparatus for. H Clementson.
Doll. F B Schults.
Door hanger. T C Pronty.
Dood lock, sliding. W Lash.
Door operating device. C L Rice.
Door, self acting. C Rondell.
Draft regulator. C F Kaul.
Draw bar attachment. M J Hoey.
Drawer guide. W W Tanner and T W Burch.
Dredge, steam. L Hussey.
Dredge, steam vacuum 2. L Hussey.
Dredgers, excavators, etc., cutter for. L W Bates.
Drill. C M Lindholm.
Dynamo voltage regulator. M P Ryder.
Dynamo from car axles, means for driving. W Biddle.
Eccentric surfaces, machine for finishing. P Shellenback.
Elastic fabric. A Strams.
Electric light circuits, registering mechanism for. W McNeill and J H Tindler.
Electrical apparatus, coin controlled. H F Galligan.
Electrodeposition apparatus. H L Bridgman.
Elevator table. J G Smith.
Engines, continuous cut off register for steam. C H Dale.
Engines, means for increasing crank throw of steam. H I Schanck.
Excavator. T P Smart.
Extensible rack. E W Leach.
Fabrics, machine for raising the surface of textile. J D Tomlinson.
Fancet, sirup jar. F H Lippincott.
Fence. C F Parks and A A Hamilton.
Fence, wire. C W Berkes and P Lesch.
Fifth wheel. W F Kramer and C F Weinman.
Filter. O P Briggs.
Fire alarm. J P Williams.
Fire escape. F Dymacek.
Flash light burner 2. M D Westcott.
Flue cleaner, boiler. C S Dean.
Fruit gatherer. A Houghton.
Furnace. A Bryce.
Furnace. F E Giesler.
Furnace. T B Moore.
Furnace. A H Woodruff.
Furnace draft regulating apparatus. G L Thiell.
Furnaces, apparatus for controlling the admission of air to. G L Thiell.
Furniture joints, device for tightening. H T Davis.
Fuse, electrical safety. O M Rau.
Game apparatus. W A Barnes.
Game board. C E Boyer.
Games, apparatus for playing. C A L Totten.
Garbage cremating apparatus. T M Clark.
Garment supporter. G W Ferguson.
Gas or other meter, coin controlled. S Simpson.
Gearing for imparting differential motion in machinery. T H Rushton.
Glass cutting tool holder. I W Heysinger.
Glass heating oven. A O Hurley.
Grain cleaner, fanning mill, and elevator, combined. J F Hatfield.
Grain separator. W W Briggs.
Grate heater, portable open. J Lawlor.
Gun mount, quick firing. A Noble and R T Brankston.
Gun sight. H Strandwold.
Halter. E P Waters.
Hammer, pneumatic. J Beeche.
Hammer, power. A Beaudry.
Harp. L Lehman.
Harvester, corn. E E Witter.
Harvesters, twine box and tension for self binding. C A A Rand.
Hay loader. J F Platt.
Hay press. J N Eastwood.
Hay rake. B F Smith.
Heating plants, air storing pipes in steam. H Martini.
Hide and skin machine. W Evans.
Hoisting mechanism. W Hoey.
Hop picking and separating machine. B A Weatherbee.
Horses from cribbing and wind sucking, device for preventing. T Redmond.
Horseshoe, elastic tread. A Lociller.
Hose to couplings, apparatus for applying. P Whyte.
Hot water heater regulator. J K Meschter.
Hotel register. D F Riegle.
Hydrocarbon burner. L H Cole and J Bower.
Ice cream freezer. E L Weston.
Ice shaver and pick. W M Seaman.
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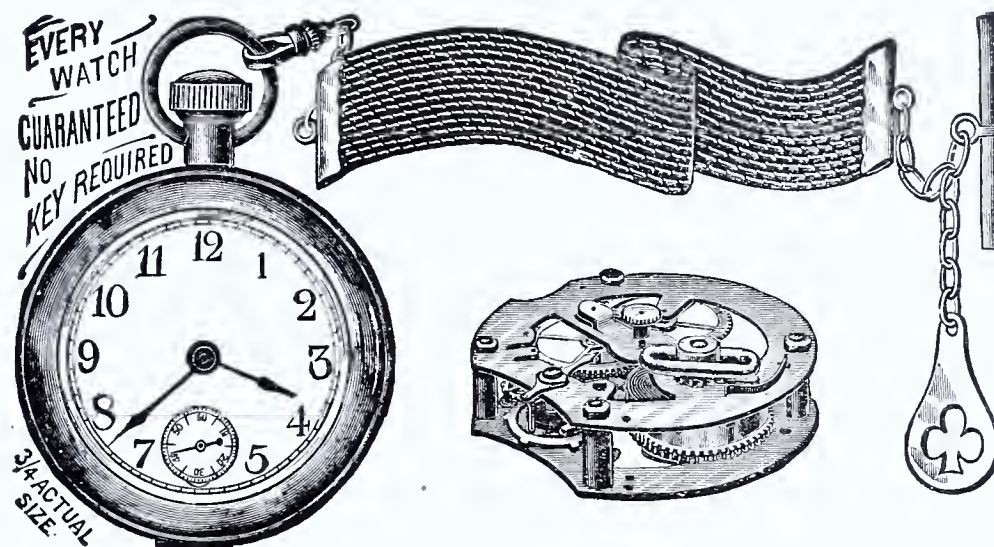
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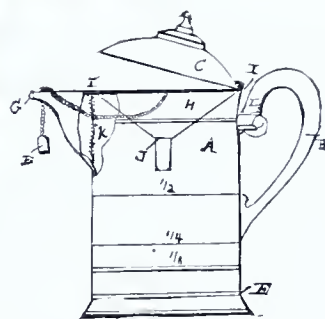
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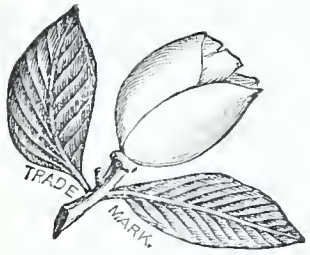
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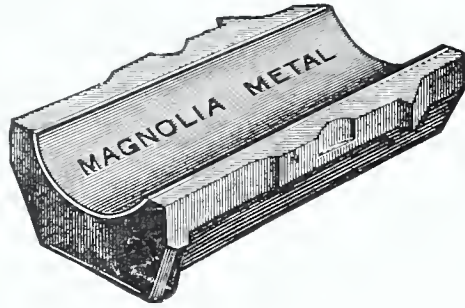
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Fifth Year. {
No. 11. }

WASHINGTON, D. C., NOVEMBER, 1894.

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A GREAT STRUCTURE.

Something About Cabin John Bridge on the Line of the Washington Aqueduct.

The Capitol building, government departments, Mt. Vernon, Arlington Cemetery, Washington Monument and Cabin John Bridge are the prominent features of interest to visitors to the Nation's Capital. The latter two, though conceived and constructed many years since, for the most part, stand as monuments to the engineering skill of those who planned them. Those unacquainted with its importance to this city the Cabin John Bridge carries with it little more than the name implies—a place of curiosity, preserved in memory of some quaint character. But those who take the time and trouble to drive seven miles up the banks of the beautiful Potomac river and inspect the Washington Aqueduct obtain a very different and lasting impression of this immense, single span stone arch bridge, now standing largest of its kind in the world.

After several surveys and urgent appeals to congress by Lieut. Montgomery C. Meigs, then an officer in the United States Engineer Corps, appropriation was made and work begun on this bridge, which now maintains the nine foot conduit that gives Washington its hourly supply of water, actual operations being commenced in 1853, with the structure completed in about a decade thereafter. The main bridge is 420 feet long, with a clear single span of 220 feet. It is 20 feet wide, and the keystone is 101 feet above the bed of the creek, the cost of the whole structure reaching \$2,905,500. The capacity of the water conduit, which has a fall of nine inches to the mile, is 67,500,000 gallons every twenty-four hours, though but 45,000,000 gallons of water pass through the conduit

at Rock creek in meeting the demands of the city. The eastern abutment of the Cabin John Bridge contains 75,959.60 cubic feet, the openings amounting to 16,380.24 cubic feet, leaving the net masonry 59,579.36 cubic feet; while the western abutment contains 65,296.56 cubic feet, with openings equal to 13,170.24, and the net masonry 52,296.32 cubic feet. Natural rock and concrete form the foundations for the abutments, which are 32 feet on their base, and the arch is composed of granite and rubble rock.

It was a number of years after its completion

The bridge is built upon and supported by these two conduits, which form the arch. The only 48 inch main for carrying water to the city comes through the M street bridge, which was constructed under the supervision of Col. George H. Elliot, the present engineer in charge of the Washington Aqueduct.

The inscription tablets on the Cabin John Bridge attract considerable attention. The one on the east end because of its somewhat obscure character and position, containing simply the name of the designer, who became famous for his engineering skill,

and the date of the beginning and finishing of the structure, reading as follows:

M. C. Meigs, Chief Engineer, Washington Aqueduct. A. D. 1853. Fecit.

The inscription on the west end appears in bolder form and reads:

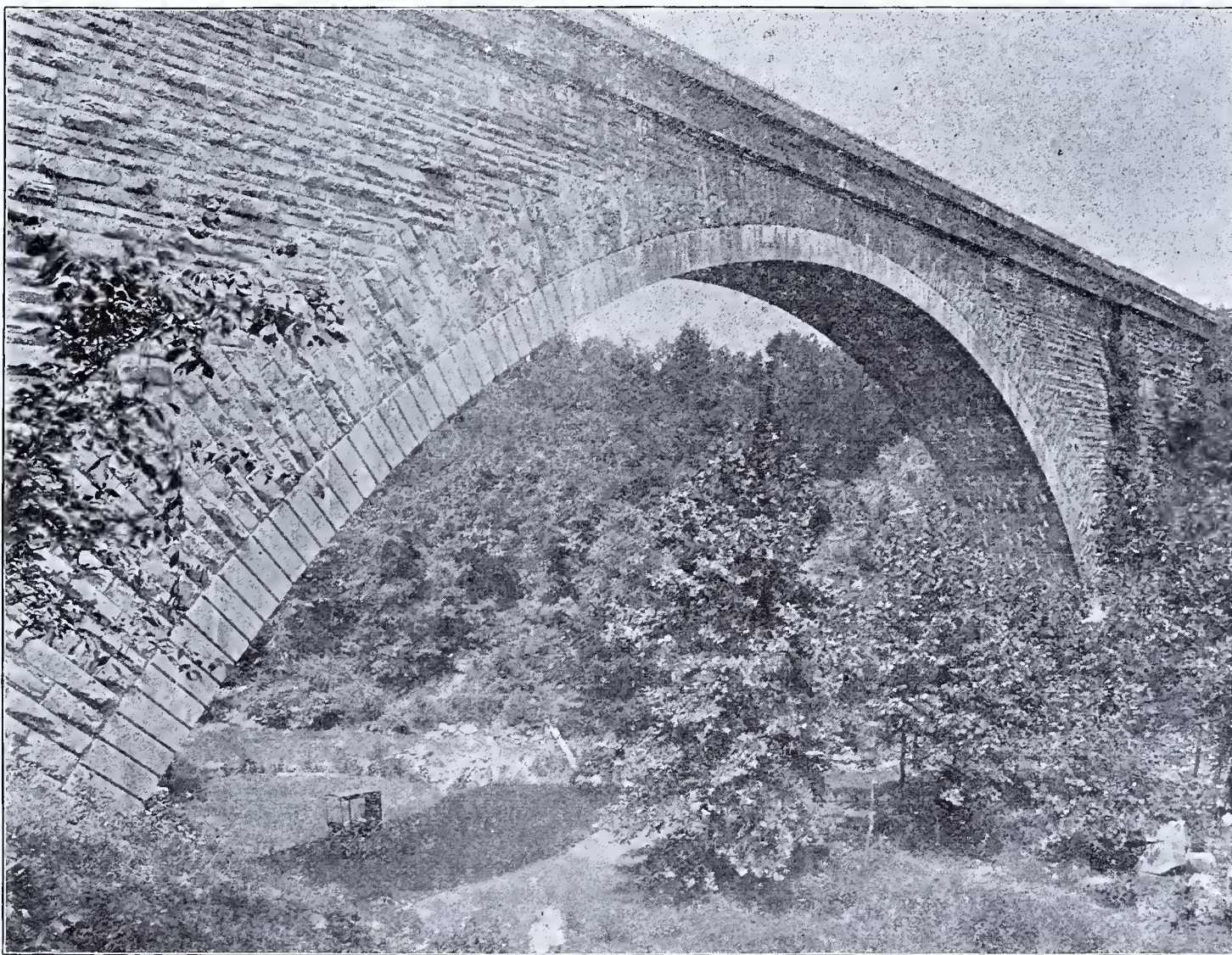
Begun A. D. 1853. President of the U. S., Franklin Pierce. Secretary of War,

Building A. D. 1861: President of the U. S., Abraham Lincoln. Secretary of War, Simon Cameron.

For many years the impression prevailed that Gen. Meigs authorized the full inscription and then the removal of the prominent name therefrom, which causes the blank to now appear. At the time this inscription was placed on the abutment Gen. Meigs was quartermaster-general and probably knew nothing about the fact that it contained the name of Jef-

erson Davis as secretary of war. It has been stated upon authority of a member of his family that he certainly had nothing to do with the removal of Davis' name. The best authority extant upon this subject is to the effect that in June, 1862, shortly after the bridge had been turned over to the secretary of war, Caleb B. Smith, the then secretary, in company with a party of congressmen, went up to view the bridge. Among the congressmen was Hon. Galusha A. Grow, the present congressman-at-large from Pennsylvania. When the

(Continued on page 217).



"CABIN JOHN BRIDGE,"—LARGEST STONE ARCH IN THE WORLD—ON LINE OF WASHINGTON AQUEDUCT.

Photo by E. J. Pullman & Son, Washington, D. C.

before this bridge formed a part of one of Washington's most beautiful driveways, and not until 1871, when Col. Elliot, the present engineer, was first in charge, were the parapets constructed that made it perfectly safe for persons to drive over such a high and narrow structure.

The water supply of Washington now passes under the Rock creek bridge, Pennsylvania avenue crossing, through two 48 inch conduits. One of these conduits carries a 36 inch and a 12 inch pipe, and the other a 36 inch pipe. But few people passing over this bridge are aware of its novel construction.

The Inventive Age

Established 1889.

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WASHINGTON, D. C., NOVEMBER, 1894.

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Under this heading may be classed the building of canals and waterways, modern vessels and war ships, modern buildings, interior views of model machine shops and factories, railroad bridges, views of engineering achievements of every nature, natural wonders and discoveries, new machines, engines, motors and developments in electrical science, novelties, labor saving devices, etc.

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It is also desired that accompanying each view, there also be sent a complete description of the subject or enterprise, or that the address of some person be given from whom complete information can be obtained.

OWNERS of lead mines in British Columbia are pleased with the new tariff schedule. Under the McKinley law foreign lead was made to pay a duty of \$30 a ton. The new tariff cuts this duty to \$15. Lead continues to be quoted at a fraction over three cents, which prevents the profitable working of any lead mine in the United States, unless it assays high in silver.

LAST month THE INVENTIVE AGE published the "discovery" of Mr. Emil Christiani, of Washington, D. C.—the trisection of an oblique angle. Now comes Miss Jesse Burgster, of Jamestown, North Dakota, with a much easier and more practical method. The correction of Mr. Christiani's Latin justifies the statement that the error was the printer's failure to correct the proof.

THE INVENTIVE AGE calls particular attention to the many novelties advertised in this issue. Many of these are very useful and will make suitable holiday gifts. We also call attention to our list of popular scientific books. The majority of these should be in the library of every mechanical engineer, electrician or scientist and the prices have been reduced to a point where expense does not stand in the way.

THE following official changes in the Patent Office were given out for publication on the 20th ult: Appointments—Herbert Lewis, of Massachusetts, and Robert L. Ames, of Michigan, fourth assistant examiners, \$1,200; George G. Thompson, of Michigan, and James S. Hazen, of Virginia, copyists, \$720. Resignations—George R. Baldwin, of Illinois, and Ewin S. Johannott, Jr., of Illinois, fourth assistant examiners.

THE Commissioners of the District of Columbia have taken hold of the street car fender question in

earnest, and an order has been issued that the various companies proceed to make thorough tests of life-saving devices with a view of determining which of the many inventions are most practical. In this order the Commissioners designate several inventions that shall receive immediate trial, among them being the Smith fender, illustrated and described in the June number of THE INVENTIVE AGE.

THE manufacture, price and output of binding twine has for some years been controlled by a trust. The Deering Harvester Company has been one of the heaviest customers. There has been some difficulty and now it is announced that the Deering people will erect a monster mill with a capacity equal to about one-fifth of the annual consumption. The Deering people control some patents calculated to cheapen the cost of manufacture, and it is not unlikely that the United States Cordage Company, as the trust is called, will find the Deering Company a dangerous foe.

THE readers of THE INVENTIVE AGE are indebted to Mr. Robt. W. Fenwick this month for a brief sketch of the interesting career of the late Judge Holt, of Washington, at one time Commissioner of Patents. The quotation from a decision in the Goodyear case indicates the keen appreciation of the rights of the inventor held by Judge Holt, and the anti-protection ideas that are prevailing among many misinformed people in Congress—and out of Congress for that matter—should be met by just such grand views of invention and inventors as are found in Judge Holt's papers.

THE industrial depression of the last two years is amply illustrated in the decreased earnings of railroads, decreased expenditures for repairs of roadbed and equipment and decreased new mileage. In the whole country, in the period from January 1st to October 1st this year, the mileage of new main line track was but 1,100, the smallest in over thirty years. The outlook for the future is much brighter, however. No industry, in the revival of business, will more speedily respond to the throb than that of railroading in all its various ramifications and environments, from additional section men to an increased demand for steel rails and modern equipments.

THE American Engineer and Railroad Journal has established an interesting department on aeronautics, under which heading will be published all matter relating to the subject of aerial navigation, which the editor truly says is a branch of engineering rapidly increasing in general interest. This department will be under the direct supervision of Mr. O. Chanute, of Chicago, a civil engineer of some note. The October number contains a description of the navigable balloon at the Antwerp exposition, also an interesting article from Hiram S. Maxim, inventor of the ingenious flying machine mentioned in the October number of THE INVENTIVE AGE.

BUFFALO, N. Y., and vicinity seems to be a fruitful locality for patent sharks. Here is where that prince of fakirs, Paul James Gregory, holds out, although his stationery would indicate that his main office was in Marilla, N. Y. This is the chap who was arrested last summer at the instance of the United States officials for using the mails for fraudulent purposes. He is now out on bail and still doing business at the old stand and in the old way. This is the modest individual who writes inventors to beware of "swindling concerns." In one of his letters he says: "Many swindling concerns have sprung up in the west, and they seem to be trying to build up a business by slandering their honest competitors. * * * I have built up my business, which is enormous, not by injuring others, but by hard work and honest competition. * * * I have a very large office, model room, agents headquarters, etc., every facility that brain and money can devise to help sell patents." Gregory's "advance fee" is \$20 and he tells the inventor not to answer his letter if he cannot comply with the terms as he cannot change them. Gregory evidently does business on the theory that a new crop of suckers matures every

Tuesday, for in the light of the testimony taken before U. S. Commissioner Fairchild, at Buffalo on June 12th last, published in the Buffalo Express of June 13th, showing Gregory to be a humbug of the first water, he is still engaged in the same old business. Here is the quotation from the Express:

Attorney Mackey introduced into evidence a lot of letters, letter heads and circulars which Inspector Coates had gathered. Some of the letters excited much merriment when read in contrast to the real circumstances. All of them were so worded as to give the impression that Paul James Gregory "patent attorney and broker," had an immense business. One of the letters, written in response to Griffin's request for the return of his \$20, excused Gregory for failure to comply with the terms of the contract by telling of large extensions that were being made to accommodate his business. He spoke of having his landlord build "additions to the building in which my offices are located, and erect another building for me." He also referred to the strengthening of floors, which were too weak to bear the weight of his large printing presses, all of which, it is said, exist only in the imagination of the said Paul James Gregory, who at the time occupied a very modest little office in the very modest locality, No. 195 East Genesee street.

Another letter of apology, written shortly before this to another of the alleged victims, gives so widely different an impression as to make his subsequent show of prosperity exceedingly ridiculous. He pictured his family as very ill and business very much on the hog train. The whole epistle teemed with such a despondency over misfortune that it must be a hard hearted wretch who could expect a patent attorney to fulfill his contract within a given time. In each of these letters of apology Gregory requested an extension for a month or two.

Another smooth individual in the same line of business in Buffalo is George B. Smith. He is the fellow who, in his circulars and in his elaborately displayed lithograph headings, last spring claimed, among other things, to be the publisher of the "Inventive Age" an illustrated magazine "published to a vast circulation." He was then located at Chaffee, N. Y., and took great pleasure in referring the inventors to Bradstreet's and Dun's. On information furnished by us the postoffice authorities soon checked him up, but he has broken out in a new spot. His headquarters is Buffalo now and he claims to publish the "Inventive World" instead of "Inventive Age." It matters not what he calls it, he is no less a fraud, unless reformation has set in since last spring. And this is the fellow who in May last wrote an inventor that he hoped he (the inventor) would not class him (Smith) with such parties as Gregory. The representations made by these alleged patent brokers, in their correspondence with inventors, will not stand the test of analysis and investigation. It hardly seems possible that an intelligent inventor could be caught by them, but we have the statements of many who have bought their experience.

Patent Selling.

After spending time, energy and money to obtain a patent on an invention the average inventor, who has made no preliminary arrangement for the disposition of his patent, naturally asks himself: "What shall I do with it?" He is soon answered. Just as soon as the mails can reach him, after his name appears in the Official Gazette of the Patent Office, which is issued each Tuesday, he is advised of the enormous fortune that awaits him, providing he acts promptly and follows certain specific instructions. He may receive one, ten, twenty or thirty letters of advice from as many different individuals, associations or agencies, but the similarity of their propositions is so striking that but for the anxiety of the inventor he would at once see the deception and quackery hidden in the jargon of circulars and other documents received. The underlying feature of nine out of ten of the propositions made is the "advance fee" desired on the part of the grand army of anxious and energetic friends the inventor has gained, all at once, in every part of the country. Nor is his fame confined to the measly little strip of land across the American continent known as the United States, for after the wash of the first wave, and before the inventor has time to properly arrange, classify and analyze the array of literature he has received from his own countrymen, he is notified of having been voted an honorary member of several Parisian Academies of Science and German and English Technical Societies—all on account of the great merit of the invention and the high respect for the inventor. He is also advised of the fact that he has been awarded numerous medals and diplomas; but rest assured that, concealed in some obscure line or corner of each and every one of these propositions and notifications, hidden beneath folds of red and blue ribbon and a wealth of gold wafers

and sealing wax, is that innocent, careless, but very significant hint, that stipulation which is prerequisite to the inventor's success, that chasm which only separates him from fortune—"advance fee." The ingeniousness of some of these patent selling fakirs is, indeed, striking, and their persistency is equalled only by the display of anxiety for the inventor's welfare. Some of them enclose a telegraph blank, accompanied by a letter setting forth that a representative of the firm or association is about to start on a tour through certain manufacturing districts where patents in the line of that owned by the inventor addressed are in great demand; and if he (the inventor) will wire at once the lowest price he will take for the patent—and "return one of the enclosed contracts properly signed," etc., accompanied by an "advance fee" of \$10 or \$20, according as the gullibility of the inventor may be sized up—which fee is just to apply on postage, printing circulars, advertising, etc.—if the inventor will be prompt in all these things and not wait to hear from other less enterprising patent brokers, then the sale of his patent will be undertaken at once by their agent about to start out on the road, etc. Of course there is another provision in the contract—an agreement to give the seller ten per cent of amount received for the patent. "This is where we expect to make our money," say they. But in nine cases out of ten this is mere dust in the eyes of the inventor. This telegram scheme is what would be called in western towns site speculation the "rush act."

Now, THE INVENTIVE AGE would take no particular exception to the "advance fee" system if, following the acceptance of the same, the patent broker did actually put forth intelligent and well directed efforts looking to the sale of the patent; but our investigations lead to the conclusion that very few patent agencies do more than obtain an "advance fee," although they may succeed in convincing the inventor, in some instances, that they really do make sales. We state a fact well known to many inventors when we say that there is usually great alacrity on the part of patent brokers in informing the inventor of sales made in general, but considerable hesitancy in giving out details. They are all great patent sellers—on paper—but when asked for names of purchasers and dates of sales, they either evade the enquiry or terminate negotiations.

There is a field in the United States for patent selling and a crying need for legitimacy in this line, but it does seem as if the temptation to humbug is so strong and the opportunity so great, that the majority who engage in the business depend almost entirely upon the cupidity of the inventor.

There is still another class who are as much the enemies of the inventor as the average patent seller. They adopt the more aristocratic title of patent solicitors, but their field is in foreign lands. We refer to that class who advise the obtaining of foreign patents after the patent has been published in this country, and who incidentally say, on the side, that they have no doubt but that a rich reward in the shape of sales in foreign countries will greet the inventor if he will authorize them to obtain foreign patents for him. In the face of the doubtful validity, and in some countries the absolute invalidity of patents obtained in foreign countries after publication of the patent in the United States, the inventor would like, and certainly needs, a little further explanation. In this connection it may not be out of place to suggest to any and all patent sellers and patent solicitors, foreign or domestic, that the columns of THE INVENTIVE AGE are always open to the rational discussion of all matters affecting patents and inventions, and the AGE is reminded by more than one of its readers that a reply to the questions raised in a communication signed "A Subscriber," in the October number, would be intensely interesting at this time. Inventors should not lose sight of the fact that there is a vast difference in patents, especially foreign patents, and while it may be possible for these foreign patent specialists to obtain a patent for an American inventor after his patent has been published in this country seven months or more, of what value is it? The inventor does not want a patent in name only, and that is

what he is likely to get if he is not extremely cautious. The INVENTIVE AGE sounds the warning. Beware of pitfalls.

The Relation of the Inventor to the Public.

EDITOR INVENTIVE AGE:—I have just read Mr. Logan's address before the American Association of Inventors and Manufacturers and think it worthy of some suggestions in reply—the more so because some words in it indicate that his ideas are founded upon an erroneous conception of the foundation of an inventor's rights. Near the close of the paper he says:

"The inventor should not be allowed to pursue, as he is sometimes inclined under the present law, a dog-in-the-manger policy. He must either do something himself or allow others to do it. He gets a valuable grant from the public and a reward for a supposed public service. He must render his service or give up his reward. The public, if they give him his patent may fairly see to it that they get the fruits of the invention."

It would be difficult to condense more error in the same number of lines. The inventor does not get a grant from the public in any sense usually attached to the word. He is one party to a contract, the public is the other. He fulfills his part in advance and the public often if not generally fails to fulfill its part; but in the sense of a grant from the public there is no such thing possible, because the public never owned or possessed anything to grant to the inventor. Neither does the public give to the inventor any reward whatever for any supposed public service. It is precisely the other way. The inventor gives to the public something and the public gives for it permission to work for the reward with "I hope you may get it." The inventor has rendered his service fully when he files in the Patent Office a full disclosure of his invention. The public has no legal or equitable interest in the invention disclosed until the expiration of the patent. Unfortunately for the inventor, if the invention is of value the same public do what they can to despoil the inventor instead of rewarding him. If I rent a piece of ground for seventeen years, the consideration being the erection of a house which shall belong to the owner of the ground at the expiration of the lease, what concern is it of the lessor whether I live in the house or keep it closed? What valid claim has he that I shall live in it and take him as a boarder? The inventor who discloses his invention in the patent takes an exclusive right to it for seventeen years. It would not be exclusive if he was compelled to share it in any way.

The constitution only authorizes *exclusive* grants. Congress may fix the term, but if it issues any patents at all, they must be exclusive for the term. This ground was all discussed in the Senate some years ago, and proposed amendments to the law on lines indicated by Mr. Logan, were laid aside for the reason that a constitutional amendment would be needed to make them valid.

Of Mr. Logan's four propositions numbers three and four would fail because, first, an amendment to the constitution would be required to give validity to any law on those lines. Second, because in view of the fact that the inventor is the *creator* of something which no power can compel him either to disclose or to use, there is no way by which the public may gain either knowledge or interest, except by means of a *trade* on terms satisfactory to the creator.

Just so soon as you deprive him of a right to control under the patent, he will cease to disclose and trust to his chances in working in secret as many do now. The first and second, sound very nicely, but would fail because of the impossibility of formulating any rules of division. There are possibilities of improvement in the patent law which shall render it easier for the inventor and harder for the infringer without going into speculative fields, when it is at least doubtful whether expected benefits would be found. The principal one of these is, place the *action* of the Patent Office beyond review by the Court. No patent ought to be declared invalid because a judge, ignorant of science or mechanics, fails to see a difference, plain to any impartial expert. A large portion of the expense of every patent suit is in defending or attacking the action of the Commissioner on the record of his own office. Let us devote ourselves to the task of making it hard for the infringer and there will be little complaint from either public or inventor.

R. D. O. SMITH.

Another Transmission of Power Scheme.

The scheme to construct a canal from a point on the Platte river to the outskirts of Omaha, forty-nine miles distant, is assuming definite shape. The people of Douglas county will be given an opportunity to vote on the proposition to give a subsidy of \$1,000,000 for the enterprise. It is estimated that a fall of 135 feet will be procured and 24,000 horse power developed. The entire cost of the enterprise is estimated at \$4,000,000.

NOTES AND NEWS.

The New London Bridge.—In its construction 31,000,000 bricks and 19,500 tons of cement were used.

* * *

Mt. St. Elias.—The scientific researches which have been made jointly by American and British scientists in Alaska, to decide upon the boundary line between British and American possessions, have found that Mt. St. Elias is on British territory. They have found the height of this mountain to be 18,023 feet, considerably higher than was supposed.

* * *

Over 500 Miles of Tunnels.—The world's tunnels are estimated to number about eleven hundred and forty-two, with a total length of five hundred and fourteen miles. There are about one thousand railroad tunnels, ninety canal tunnels, forty conduit tunnels, and twelve subaqueous tunnels, having an aggregate length of about three hundred and fifty miles, seventy miles, eighty-five miles and nine miles respectively.

* * *

An Old Mine.—Dolcoath, one of the mines of Cornwall, has been worked so long that even tradition does not give the date of the opening. Prior to 1788 the product was mostly copper and it is said equalled over \$10,000,000 in value. For some years it was abandoned, but in 1799 the present company was formed, and the dividends to date have amounted to \$5,000,000. The mine is now down to the 2,550-foot level, and gives employment to 1,300 men.

* * *

New Canadian Ship Canal.—The Canadian Ship Canal at Sault Ste. Marie, is about completed. It has cost something over \$4,000,000 and is said not to be a very perfect piece of engineering. One of the walls threatened to cave in because of imperfect foundation at some points, which necessitated immediate repairs. On the whole, however, it is considered a great work, completed in a remarkable short period. The canal is 3,500 feet long, and has a mean width of 152 feet, while it will carry vessels drawing 20 feet.

* * *

New Torpedo Boats.—The Navy Department is now getting out plans for three new torpedo boats. The general dimensions of the three vessels are to be: Length, 160 feet; beam, 16; mean draught, 5; displacement, 135 tons; indicated horse-power, 2,000; speed, 24½ knots. The armament will be three single-deck torpedo guns; three one-pounder rapid fire guns; four auto-mobile torpedoes, 1,800 rounds of one pounder ammunition. Each vessel is to have a coal capacity of 45 tons. Fifteen hundred dollars will be allowed for each quarter knot in excess of the 24½ required up to 25½ knots, and \$3,000 for each quarter knot in excess of 25½ knots.

* * *

Oyster Planting.—The possibility of the exhaustion of the oyster beds of Maryland has led to an unusual interest in the work of increasing the number of oyster beds. During the last session of the legislature of that state, a charter was granted the Baltimore Harbor Company, giving them the right to plant oyster beds along the coast. The following scheme has been approved: A canal will be cut through the narrow strip of land which separates the strait of Chincoteague from the Atlantic ocean, beginning above Ocean City. This canal will let the salt water of the ocean into these bays and inlets, and then oyster beds can be planted. An area of 48,000 acres will thus be gained for this purpose; and the canal will also be convenient for commercial uses. An annual crop of 40,000,000 bushels of oysters, worth in the beds fully \$20,000,000, will thus be added to the oyster industry.

Meeting of Street Railway Association.

The thirteenth annual convention of the American Street Railway Association, held in Atlanta, Ga., Oct. 17-19, was attended by over 1,000 people interested in street car matters and is spoken of by all who attended as having been a most enjoyable and profitable session. Many valuable papers were read and the exhibition of apparatus and material by manufacturers of street railway supplies and the display of devices and systems by inventors was very large and interesting. The next meeting will be held in Montreal. The following officers for the ensuing year were elected: President, Joel Hurt, Atlanta, Ga.; Vice Presidents, W. Worth Bean, St. Joseph, Mich.; John M. Cunningham, Boston, Mass.; Russell B. Harrison, Terre Haute, Ind.; Secretary and Treasurer, Wm. J. Richardson, Brooklyn, N. Y.; Executive Committee, Henry C. Payne, Milwaukee, Wis.; W. H. Jackson, Nashville, Tenn.; D. C. Hamilton, St. Louis, Mo.; G. C. Cunningham, Montreal, Can.; J. N. Partridge, Brooklyn, N. Y.

Distribution of Compressed Air in Paris.

In 1879 the first trials were made in Paris of what was afterward known as the Popp compressed air system; the earliest installation was on a very small scale, and for some years the application was limited to the operation of clocks in the streets as well as in private houses. The central station was located in a small building, in the basement of which were two compressors driven each by a six horse-power en-

the service pipes are of lead, and their diameters vary from 3.15 inches to 1.58 inches.

When the station on the Quai de la Gare was undertaken the Creusot Company, which supplied the engines, guaranteed as a maximum consumption of fuel 1.54 pounds per one horse-power per hour.

The trials demonstrated a mean total efficiency of 80.8 per cent.

The applications of compressed air in Paris are very numerous and varied. It is used by many workshops in old steam engines, the boilers serving

Compagnie Generale des Omnibus to construct three lines in Paris, which will be opened for traffic during the present year. In the Conti system the air is compressed at a relatively high pressure at a central station; it is then admitted into the mains *B* placed beneath the rails (see diagram, figs. 1 and 2).

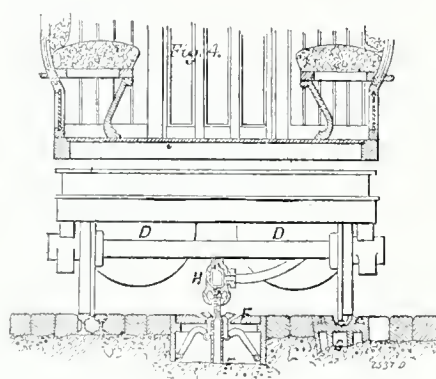
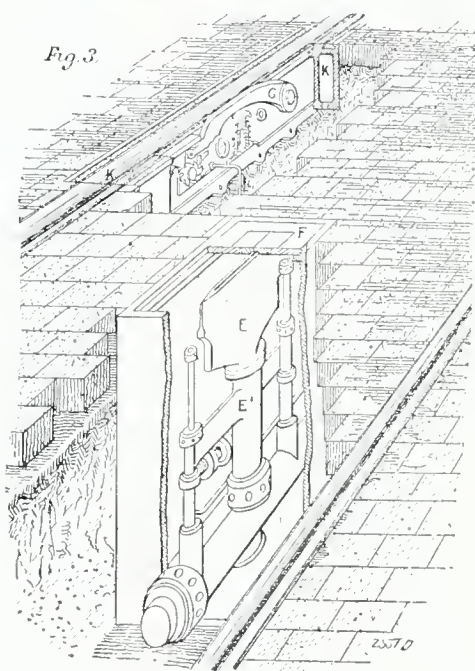
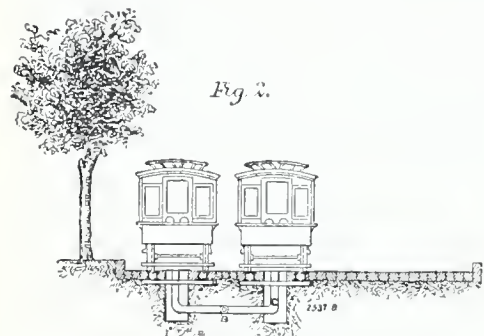
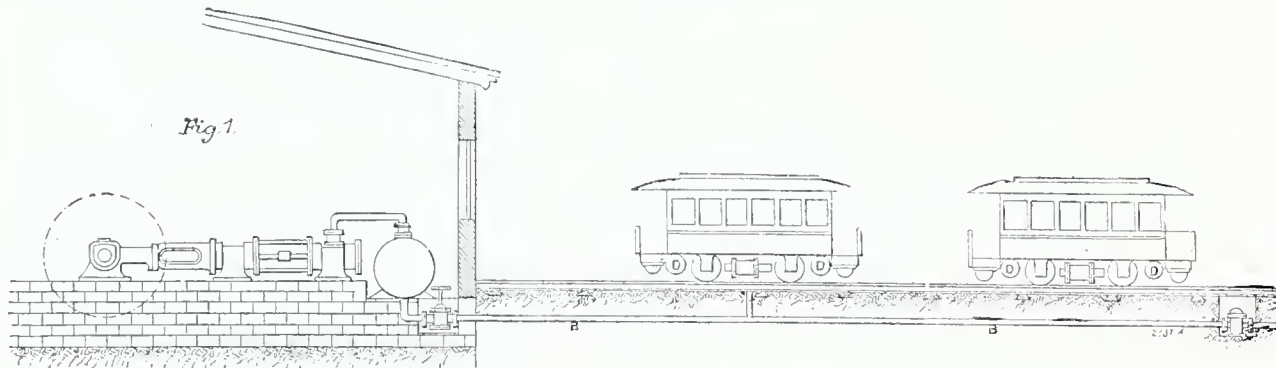
Branches *C* lead the air nearly to the surface into automatic devices by which the car reservoirs can be charged. By this arrangement it is considered that one central station will be sufficient whatever the length of the line may be; and as the charging

devices can be introduced at short intervals, the dead weight of reservoirs to be carried is relatively small. The distance between the charging stations varies according to the circumstances, but for convenience they should be located at the recognized stopping-places. Fig. 3 is a diagram that gives some idea of the arrangement. An iron box is sunk into the roadway to inclose the mechanism; the box is covered by a plate containing two hinged flaps *F* placed immediately over the air nozzle *E*. The nozzle is the continuation of a plunger working in the cylinder *E*, *I*, which can be placed in connection with the air main. As the front truck of the car passes over the rails it strikes the lever *G*, and, depressing it, opens a valve that admits air beneath the plunger *E*, raises it, and causes the air nozzle to push open the flaps *F* and rise above the level of the road. By the time it has reached its full height the nozzle engages in a connection, *H*, communicating with the reservoirs, which are filled in a few seconds. The valve is then closed, and as the car proceeds the lever *G* is released, the air beneath the plungers in the cylinder *E* escapes, and the nozzle falls, the flaps *F* closing over it and restoring the street surface. In the event of the mechanism becoming deranged, air standpipes are provided, so that the reservoirs can be charged by coupling up. The results obtained will be watched with considerable interest.

For the information set forth above we are indebted to Engineering, of London.

The New 40-ton Electric Locomotive.

In the August number (1893) of THE INVENTIVE AGE was published a cut and description of the 30-ton electric locomotive made by the General Electric Company and exhibited at the World's Fair. The illustration presented herewith shows a 40-ton locomotive recently turned out of the Lynn shops by the same company, which, undoubtedly, is the most



THE USE AND DISTRIBUTION OF COMPRESSED AIR IN PARIS.

gine; on the first floor were the pressure regulators and other controlling apparatus, and a master clock which distributed pneumatic impulses at minute intervals throughout the system of air pipes.

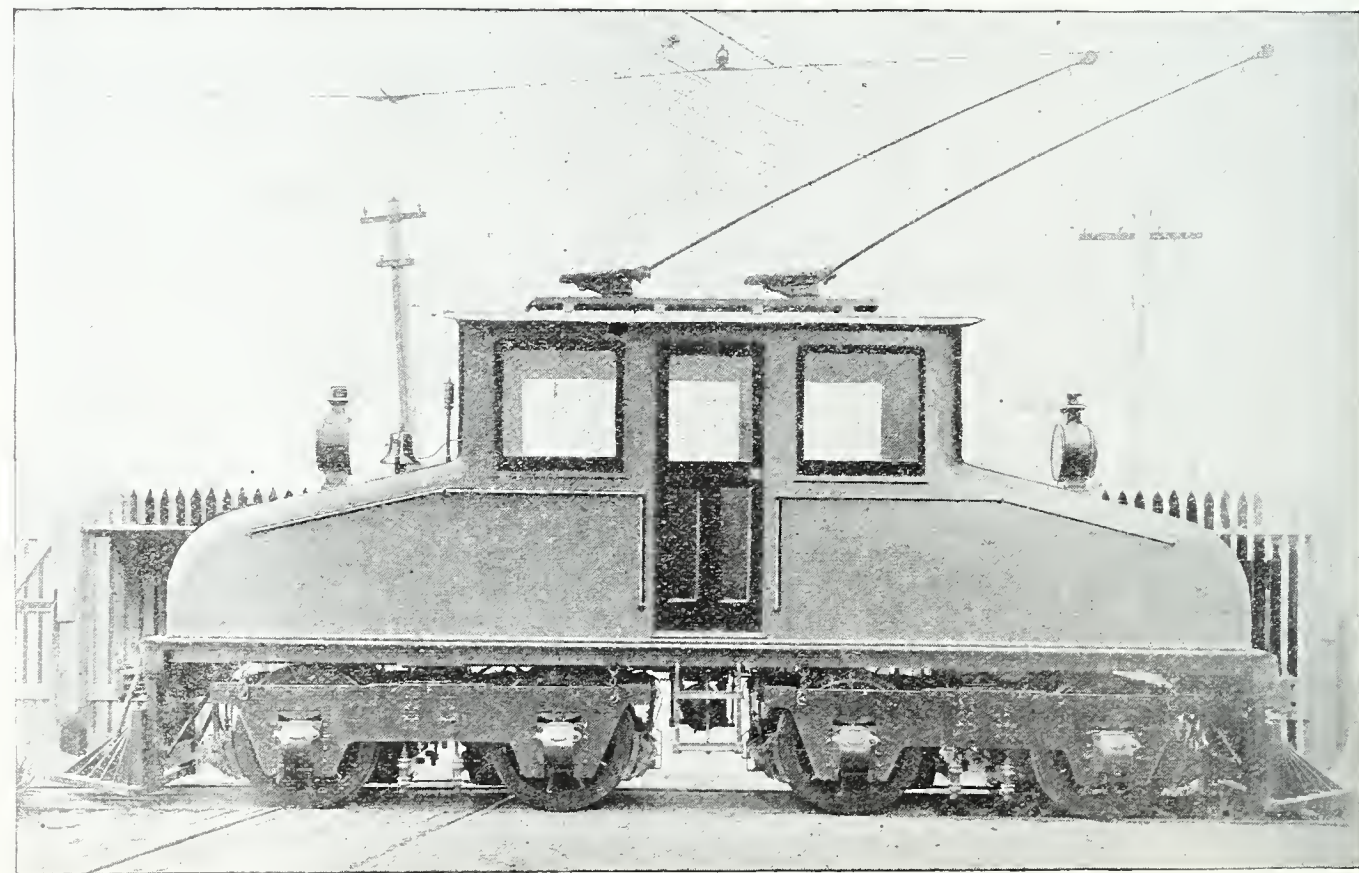
In a few years, however, applications to obtain compressed air as a motive force became numerous from small users of power, and the rapid increase in demands rendered it necessary to increase the very modest installation in the Rue St. Anne. The first extension was completed in 1880, when the Rue St. Fargeau works were started on a sixty horse power basis. Anticipating rapid extension, Mr. Popp had secured a site of nearly eight acres in the Rue St. Fargeau, and by 1887 no less than 5,000 horse-power were required to compress the air consumed. Fresh extension followed, and large additional works were completed in 1892 on the Quai de la Gare.

The Quai de la Gare works were designed for a total capacity of 24,000 horse-power, divided into three groups. The first section of 8,000 horse-power is now at work. The air is compressed by four triple-expansion Corliss engines (2,000 horse-power) and steam is supplied by twenty Babcock & Wilcox boilers, divided into batteries of five. The compressors operate by stages, and have each two low-pressure and one high-pressure cylinder. The air is cooled during compression by spray injectors. The engines are vertical, and the compressors are driven from an overhead shaft.

The boilers are registered for 170 pounds, and the working pressure is about 140 pounds per square inch.

The compressors are arranged to deliver into the receivers at a pressure of 114 pounds per square inch. The quantity of air actually compressed by the four engines per hour to 114 pounds is equal to about 70,000 cubic meters, or 2,470,000 cubic feet at atmospheric pressure. The air is compressed by each engine into two reservoirs having a capacity of 1,000 cubic feet, whence it flows into the principal air main, which is 19.69 inches in diameter. The sizes of the mains vary from this diameter to 11.8 inches; the larger are made of wrought iron welded, the smaller are of cast iron. The secondary mains range from 7.87 inches in diameter to 1.58 inches;

as reservoirs in which the air is heated before admission to the cylinders. It is also used for ventilation, refrigerating, manufacture of ice, running of



NEW 40-TON ELECTRIC LOCOMOTIVE BUILT BY THE GENERAL ELECTRIC COMPANY.

elevators, pneumatic clocks, printing presses and all manner of industrial pursuits.

One of the most interesting applications of compressed air will be that for the propulsion of tram cars on the Conti system, a system already in experimental use in Vienna. Some preliminary trials have been made at Nantes and at Nogent, and the results obtained sufficiently good to justify the

practical electric locomotive ever constructed. It is designed to perform the ordinary work of a steam locomotive of similar capacity, where excessive speeds are not considered requisites, up to about thirty miles an hour. It is made up of two similar but independent trucks, each having four wheels. Each pair of wheels is driven by its own specially designed motor of the single-reduction spur-gear

type, mounted upon the axle, as in ordinary street car practice.

The truck frame is constructed of plate iron and channels, designed to obtain at the same time both strength and simplicity. The entire weight of frame including the cab is carried on elliptical springs resting on the top of the journal boxes. This suspension secures easy riding and minimizes the wear both of the locomotive and the truck. The journal boxes are of cast iron, with phosphor bronze bearings hydraulically pressed in. Lubrication is provided for by means of a large well for oil and waste. The box slides in jaws protected by adjustable shoes to take up the wear. The journal bearings being outside, all parts are easily accessible for purposes of inspection and repair, and to insure against any bending caused by hard usage, the axle and journals are made large.

The cab rests on the truck in a manner somewhat similar to that in which the ordinary passenger car is mounted, ample margin for wear and strength being provided. The cab itself is constructed of sheet iron, and the windows are so arranged as to give an almost unobstructed view from one position in all directions. The design of the cab is such as to give plenty of available floor space without making the top of the cab long enough to obstruct the sight. The electrical equipment comprises, besides the motors, a series parallel controllers, an air compressor, which provides air for the brakes and whistle, and the automatic safety devices. In addition there are bells, head lights, and sand boxes.

Proposed Change in Patent Laws.

One of the demands persistently forced on the attention of Congress is a radical change in the patent laws in order that the people may have the benefit of inventions free of cost. A literal compliance with this demand is simply impossible for, if no inducements were offered to inventors, very few new discoveries in applied science would be made; and, if the policy of stimulating invention, by offering hope of revenue, is to be continued, it cannot be without cost. It is understood that the patent committees of Congress are considering various propositions affecting the patent system, and that, at the next session, one or more bills will be reported with a view to meeting the wishes of those who object to monopolies.

We do not suppose there is any serious danger of a reform that will take the shape of a destructive agency. There are very few Congressmen who do not know that this country is more indebted for growth and development to the patent system than to any other product of legislation. Now and then some freak of political lightning hurls into Congress a man who knows nothing about this subject and very little about anything else; but this sort of statesmen are not sufficiently numerous to be feared. Their cry of "monopoly" when raised against a system demanded by expediency, founded in equity, and vindicated by more than a hundred years of beneficent operations, can exert no great influence. They are occasionally annoying, but they cannot control national affairs.

If, in order to let the people have the benefit of great inventions without paying for them in the manner now in vogue, it should be proposed that the government buy out the rights of inventors and give those rights to the public, something could be said in favor of the proposition. But it would be difficult to frame a law for that purpose that would operate fairly or satisfactorily. The difficulty in determining what to buy and what not to buy would be very great and there would be wide differences of opinion as to prices. Anything in the nature of confiscation—like compelling a man to sell a patent at a nominal price—would not only be tyrannical, but would strongly tend to repress inventive ardor.

The impression that inventors have been generously treated by the government is erroneous. The patent system, while confessedly the most useful of all branches of the public service, is not only self-supporting, but it has several millions of money in the Treasury as a surplus. In other words, the inventors of the United States, a majority of whom are men of small means, and many of them very poor, have paid all the cost of running the patent office and put millions into the available funds of the government. And notwithstanding these facts, that bureau is persistently and systematically pinched in appropriations to such an extent as to seriously hamper it in the performance of its work. It lacks room and is deficient in clerical force. The greatest factor in the nation's unparalleled growth is not permitted to use its own earnings to facilitate the objects of its creation and existence. Whatever may be undertaken in the way of changing the patent laws, it is hoped that the nation will not try to kill and eat the goose that lays golden eggs.—*Washington Post*.

Paris municipal authorities offer prizes ranging from \$400 to \$2,000 for smoke suppressing devices.

A Remedial Invention After Centuries of Trouble.

The man who invented striking clocks seven hundred years ago thought that he had done something for the benefit of mankind, and mankind thought so too, at first—for by the new machine could they not with their ears also learn the "time o'day" that before they could ascertain with their eyes only? But mankind soon found that hour striking was not an unmixed blessing, for it was of constant occurrence that when the longer hours were sounded some listeners would be quite uncertain whether they had counted the strokes correctly and so ascertained the true time; and this doubt was always at least unpleasant, or it might lead to serious consequences—perhaps cause the wrong man to be hung for murder, or punished for some other crime, because witness for the defence who had heard the public, or the household, clock strike could not positively swear to such time as might prove an alibi for the accused, who had chanced to see "about the time the clock struck ten or eleven, I aint sure which." Again, mistaking the hour sounded would cause the failure of an important appointment, the missing of a stage coach or train, or fatal neglect in not giving essential physic to the sick baby—and an endless catalogue of troubles, great and small.

Thus men have been tormented with striking clocks ever since the first one of record was unluckily devised in the twelfth century, though some centuries later they sought relief in clocks constructed to repeat the hour strokes so as to give the listener a double chance to count correctly, though if he did not count the same number both times he would be in helpless doubt as to which count was correct—an aggravated victim of the clock trouble still. As elderly persons know, and as those in the clock trade assert, clocks that strike are not now so generally in use, and are manufactured in less proportion than formerly, and much of this increasing disuse, or disrepute, so to speak, is doubtless chargeable to the counting trouble.

But our own great century of progress was not to close without long suffering humanity being provided with a means of relief from the striking clock persecution, for one of its American victims conceived a manner of so sounding the hours that even the careless listener may not be mistaken—and the "Volley" stroke was recently patented by Jas. W. Dorr of Florida, now resident at 220 First St., S. E., Washington, D. C., through the well known patent firm of Mason, Fenwick & Lawrence of this city.

The happy listener to the volley clocks of the future (and doubtless all clock striking will eventually be done that way) will have the units of the hours so addressed to his ears in groups of strokes, separated by intervals of silence, that he will scarcely have to count to certainly know the time. Four volleys of three strokes each, or three volleys of four strokes each, will tell the longest of the hours, and counting will hardly be necessary, for the ear notes sounds as readily as the eye notes objects, and there is no mental process of counting when three similar objects come simultaneously under view, for the eye instantly takes in the number as though the group was but a single object—and it is in fact but an "object" made up of three parts. So, also, groups, or "volleys," of sounds will not be "counted" in their unit parts, their effect being that of an involuntary impression of their true number conveyed direct from the ear to the brain. In illustration of the greater facility with which clock strokes in volleys can be counted, as compared with the old way of continuous strokes, the reader may make twelve equidistant dots of the pencil and see how much more difficult it is to count them than if the twelve dots were arranged in four groups of three dots each, with a space between each group equal in length to the space occupied by one of the groups. He will probably then be convinced that the volley method of announcing time will relieve mankind of the striking clock trouble that has outlived long centuries—perchance to die with this, which has already seen many other old poor ways and things die to give place to the better.

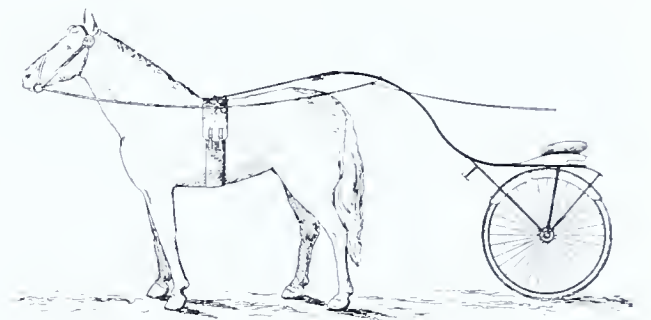
The Mania for Inventing.

Some inventors are so exceedingly jealous of their own powers that when they have invented and patented, say, a coal shovel and undertake its manufacture, they must not only make the shovels, but make also the machines to make them. No ordinary machine will answer for cutting out the blank. It must be one of their own invention. Indeed, the metal must be rolled on a set of rolls which they have invented, different from anything that is made in any part of the world, and, if they could have their way, they would have their own iron mine, have a blast furnace of their own design, built from their own specifications, would work the metal in their own puddling furnaces—in fact, would not allow the ingenuity or inventive powers of others to diminish in any way the credit which would accrue

to them from the invention of their remarkable shovel. This foolish idea, of not only inventing the thing, but of inventing also the machine or machines to make it, is one of the rocks on which not a few companies have been wrecked. It is not necessary for every man to invent every piece of machinery that he puts into his factory, for the chances are that other inventors and other men have built just such machines as are wanted, and have made them a great deal better adapted to the work than would be possible for what may be called an amateur. Capt. Ericsson once said, in substance, that when other men have devoted much time and labor to a problem, their solution is much better than can be obtained by any single individual. Wisdom, then, dictates the accepting of the machines already perfected rather than, for the sake of originality, trying to find a substitute.—*Cassier's Magazine*.

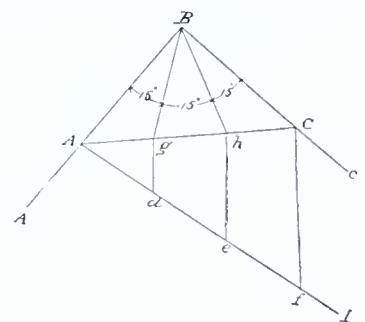
New Trotting Sulky.

If the invention of Mr. Lawson W. Hampton, of Elizabethton, Tenn., proves as practical as it is novel, we may soon expect to see a revolution in the style of racing sulkies. Mr. Hampton applies the bicycle principle, ball bearings and pneumatic tire, to the vehicle, and a means for connecting the single wheel to the horse, whereby he is allowed greater freedom of movement than is possible under present conditions. The illustration presented herewith gives a fair idea of the invention. Attached to the axle of the wheel are six braces, three on each side,



spread out longitudinally from the axle and joined to the rear end of the reach. The reach is formed of T-iron, curves upwardly over the horse's back and secured thereto by a circular rim, rigidly fastened to the girth. The rim is formed with a flange, which curves to conform to the shape of the horse's back. Not only is the reach so adjusted that it will be free to swing horizontally, so as to accommodate itself to the movements of the vehicle, but the rim is so arranged as to swing on the reach to compensate for the movements of the horse. It is designed to construct the reach and attachments of aluminum, because of its lightness and great strength. As a racing and training vehicle this invention promises to be a success. Mr. Hampton is a horseman himself, and has used a working model for some time. He is confident the world's trotting record will be lowered by the use of this sulky.

To Divide an Angle Into Three Equal Angles.



$ABC = \text{Angle.}$

Measure from B any 2 equal distances.

BA' and BC' .

From A' draw line to C' , forming $A'BC'$, an isosceles triangle.

From A' draw—at any angle, acute is more convenient than obtuse, and any length—a line $= A'I$.

Measure on $A'I$, from A' any 3 equal distances $= A'd, de$ and ef .

Connect $C'f$; then with triangle and straight edge draw through d and e , to an intersection with $A'C'$, lines dg and eh , parallel to $C'f$.

Connect Bg and Bh forming $A'Bg, gBh$ and hBC' each $= \frac{1}{3} A'BC'$.

NOTE:— $A'f : A'C' :: A'd : Ag$.

Quod erat demonstrandum.

JESSE BURGSTER.

Jamestown, N. D., Oct. 18, 1894.

By tests recently made at the laboratory of the Underwriters' Electrical Bureau, in Chicago, it has been demonstrated that iron piping, through which a current of electricity was conducted, was badly pitted in the short space of 1,333 hours.

The Boynton Bicycle Railway.

The aim of the Boynton bicycle railway system is to simplify construction and largely reduce friction, thereby increasing safety and speed and correspondingly minimizing wear and tear of rolling stock and track. The high speed and great carrying capacity of the bicycle is well known, and its principle is embodied in the Boynton railway system. The inventor applies it to railway lines already con-

retails for \$1. THE INVENTIVE AGE for one year and "Tips to Inventors" will be sent to any address for \$1.50.

New Compressing Method.

A shipment of cotton has been made from Waco, Texas, to Boston, Mass., compressed by a new method, the Bessonnette compress. The car contained 112 bales of cotton weighing 55,000 pounds. The cotton is compressed in cylindrical-shaped bales

Greek Trade Mark Law.

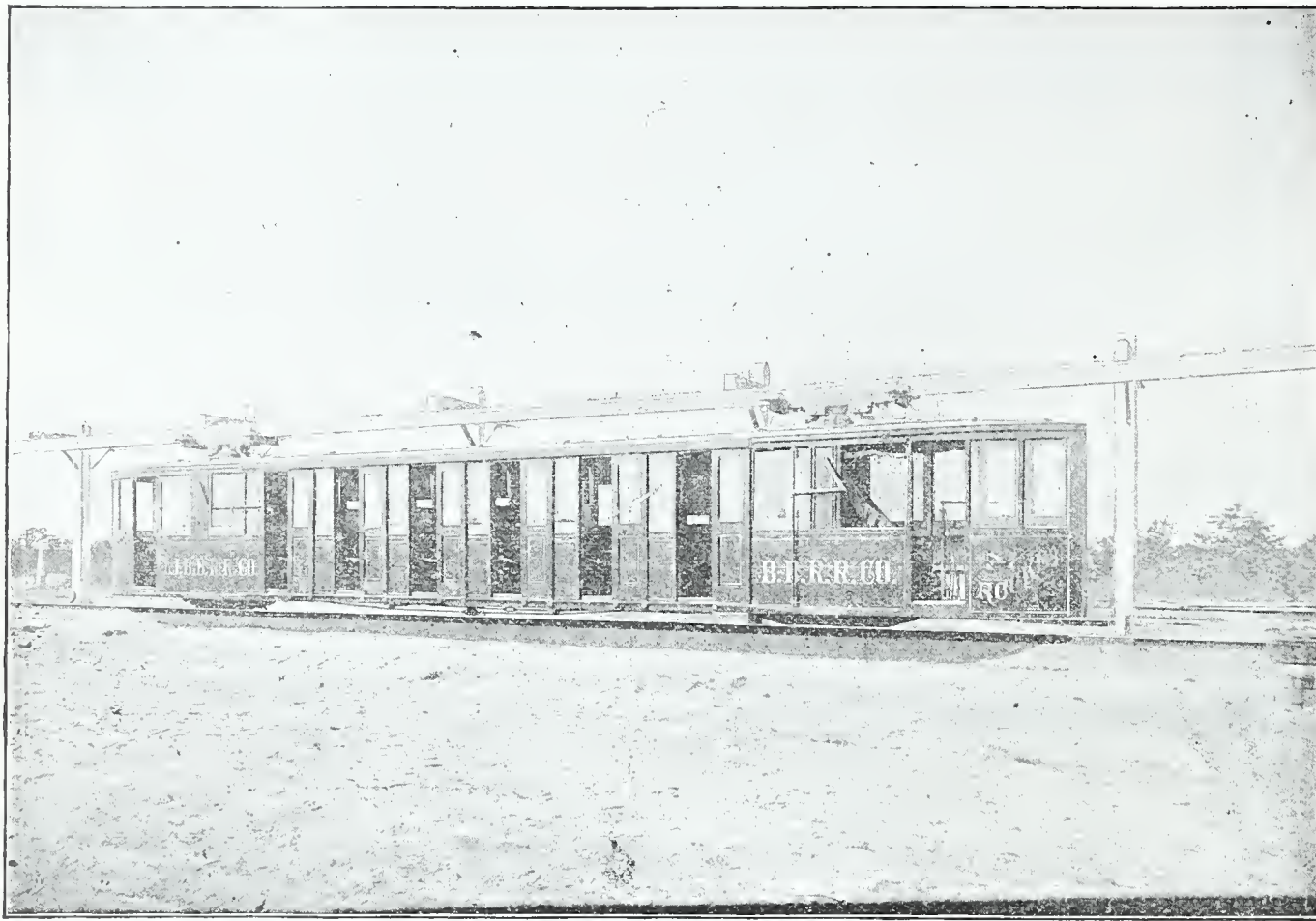
The land of the Ephors and the Areopagites comes to the front with a new law upon a matter that neither Solon nor Lycurgus ever thought of; nor, if they had, would have deemed worthy their attention. Even the brilliant achievements of the days of Pericles in the arts and commerce did not awaken in the Greek mind a sense of the need and value of trade mark laws. In the simple commercial conditions of that age it is likely the need did not exist. And so it was reserved for the closing years of the XIXth century to show the ancient peoples, like those of Egypt, Japan and Greece, joining hands with the youngest, like the United States and the French Republic, in legislation for the protection of industry and the artisan.

These reflections naturally arise from the announcement that for more than a year past the Kingdom of Greece has had a trade mark law, as published in the Patent Office Official Gazette of October 2d. Some of the features of this law are interesting. The statute embodies the sound common law principle that a trade mark belongs to him who first adopts and uses it. This is the more interesting, since in Great Britain there is a manifest tendency to recede from this impregnable position. It is also noteworthy that the law embodies the common law doctrine that the title to a trade mark cannot pass except with the business with which it is associated. This has also been made statutory in other recent legislations.

The formalities for registration are simple, and present no obstacle to foreigners who have obtained registration at home, provided there is a convention between the two countries for the reciprocal protection of this kind of property. As there is no such convention between this country and Greece, citizens of the United States cannot at present enjoy the benefits of the law.

The fees are moderate, as will be seen on remembering that the Greek *darchma* is the exact equivalent of the franc.

In prescribing the destruction of the goods as a penalty for infringement the law has adopted what to the American mind appears like a relic of orientalism or mediaevalism, and more worthy of reactionary Sparta in her palmyest days than of progressive Athens. There may be conditions under which the public safety justifies the destruction of private property; as when we blow up buildings to arrest the progress of a conflagration. But nothing seems more irrational than to destroy a valuable



SIDE VIEW OF MOTOR CAR "ROCKET," ON LONG ISLAND BICYCLE RAILWAY.

structed, and has also devised a less expensive method of building roads where new lines are to be run. On a standard gauge railroad he runs two trains, one in either direction, the rails being far enough apart to accommodate the trains in passing each other, while in the construction of new roads for his system he uses but one rail, unless a double track is desired. The locomotive driving wheels have double flanges, and the friction being so greatly reduced it is thought they can be driven at twice the speed now attained by the ordinary method, or relatively ninety miles per hour. The overhead guiding beam is set inward on curves, thus tipping the train toward the center of the curve and balancing the centrifugal force upon the one rail track, just as the bicyclist does with his wheel in rounding corners. The cars are made light but strong, of steel and veneer, four feet wide, and two stories high where traffic is heavy. In ordinary railroad transportation about one ton of weight is required to convey a single passenger, and an empty freight train weighs about as much as the paying freight it will carry. In the Boynton system it is claimed that trains can be made to carry more than five times their weight without corresponding loss of wasteful friction. The cars in this system being long and narrow the weight of load is placed near their center, while the train, being guided in grooves between an upper support and lower rail, is very much less apt to derailment. With a train of this character it is found that the greater the speed the smoother the train will run, the motion of both the cars and engine being controlled by the overhead structure.

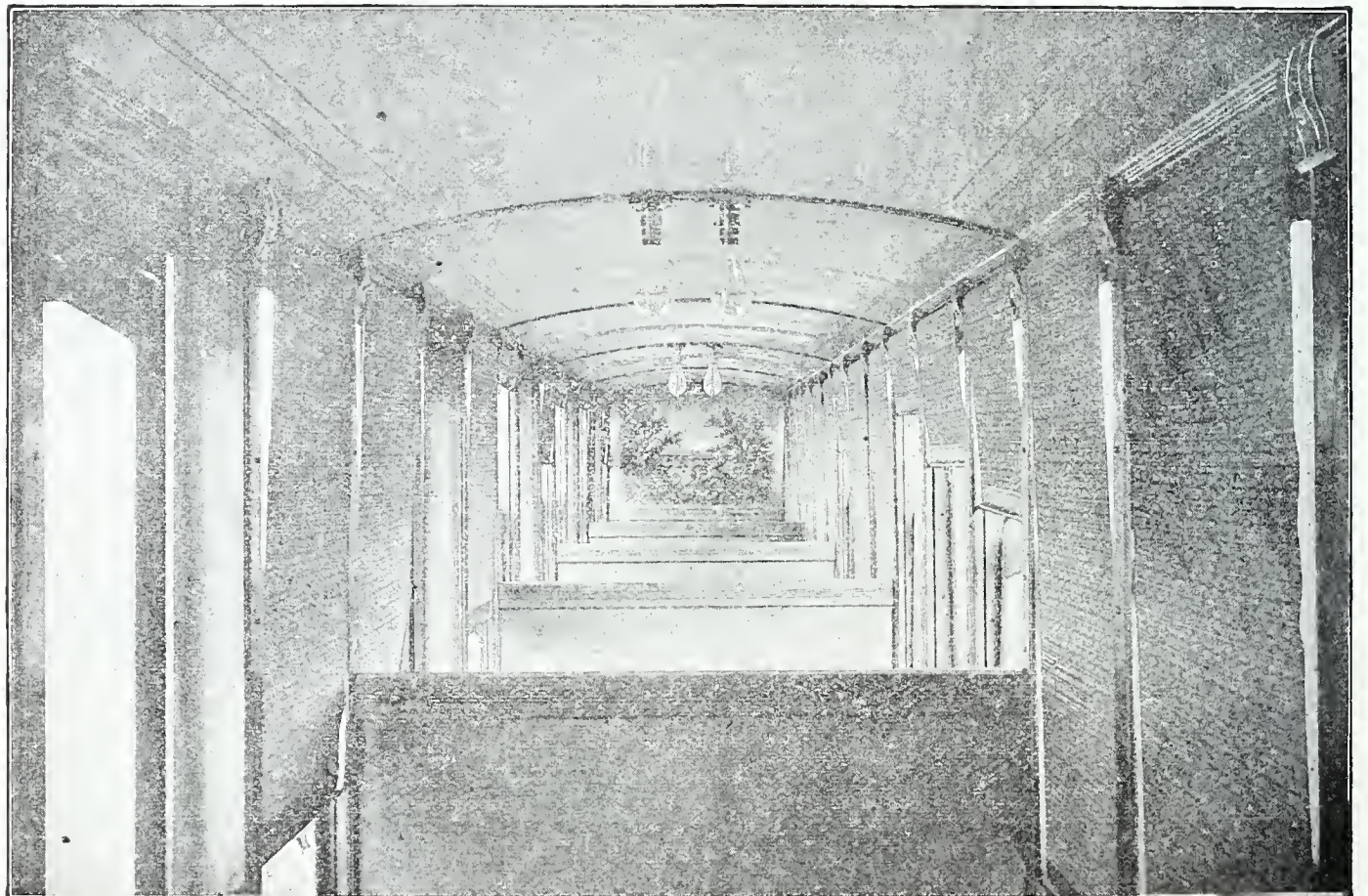
A short line of this system of railway propulsion has been in operation on Long Island for sometime, and the system is intended for the use of either steam or electricity as the motive power. It has been examined by eminent mechanical engineers and prominent men practical in railroading and received the endorsement of many of them.

This system differs from the Brock system in many features as will be observed in an illustrated article on the latter invention to appear in a subsequent issue of the INVENTIVE AGE.

"Tips to Inventors."

This is one of the most instructive and useful works for mechanics and inventors. Its author is Robert Grimshaw, M. E., and the book, cloth bound,

averaging sixty-five inches in length, twenty-four inches in diameter and thirty-one pounds to the cubic foot in density. The method of compression is described as follows: "As the cotton is ginned it



INTERIOR VIEW OF MOTOR CAR "ROCKET."

is run out on a spindle and put up much after the fashion of a spool of thread, except that it becomes solid all through." Bales of any size and of almost any density can, it is stated, be made, and the inventors of the system claim many advantages in cost and protection of the fibre.

THE INVENTIVE AGE for one whole year, sent to any address for \$1.

article of commerce because it bears an illicit trade mark: Since it not only punishes the wrong-doer but inflicts damage on the whole community.

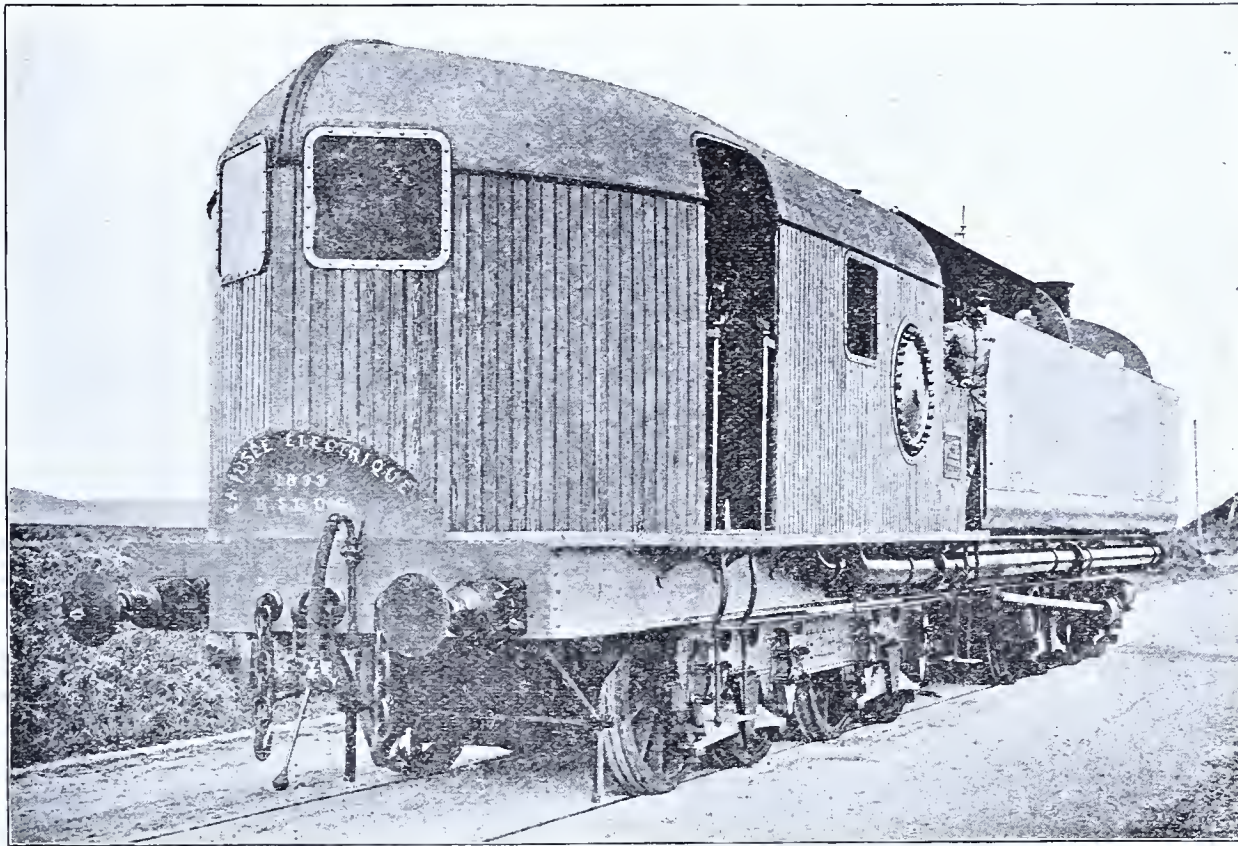
On the whole the Hellenic Kingdom will find a cordial welcome into the family of industry protecting nations. N. A. SEELY.

U. S. Patent Office, Oct. 4, 1894.

Important features in next issue of AGE.

The New Heilmann Electric Locomotive.

The new Heilmann electric locomotive seems to have passed the experimental stage as the company on whose lines the first test was made in France has ordered two more equipments, the engines to be of 1,500 h. p. each. Some improvements will be made in these over the first one but they will resemble, substantially, the cut herewith presented. The first practical test of the Heilmann electric lo-



THE HEILMANN ELECTRIC LOCOMOTIVE.

comotive was made on the 9th of May last, says a writer in the *Revue Illustrée*, on the Harve line. The locomotive is slightly over 13 feet in length and weighs 100 tons. The general plant consists of boiler, horizontal compound engine, developing from 600 to 1,000 h. p., and a six pole C. E. L. Brown dynamo of a normal capacity of 410 kilowatts. The electric motors mounted on the axles are eight in number and are 60 kilowatts capacity each.

In the official test this locomotive, attached to eight firstclass coaches, reached a speed of a little over 65 miles an hour.

United States Consul Henry P. du Bellet, thus speaks of the Heilmann engine:

The Heilmann engine, to which the inventor has, in honor to the memory of Stephenson, given the glorious name of "Rocket," is positively the first electric locomotive that has run on any of the great railways of the world, pulling a train made up of the usual number of cars. * * * Mr. Heilmann had a novel idea. Instead of generating electricity at a fixed point and sending it through a wire to the train, why not generate it on the road on the locomotive itself, converted into a rolling power house? Instead of putting in motion through the usual attachments the wheels of the locomotive, why not use the steam engine to operate a dynamo furnishing as it is needed, directly and on the spot, the electric power necessary?

No doubt, at first sight, this conception may appear illogical, for the reason that it results in a triplicate and inverse transformation, to-wit, (1) heat into mechanical operation, (2) mechanical operation into electricity, (3) electricity into mechanical operation, whereas the steam locomotive merely transmutes the heat of the boiler into work. But this apparently irrational and onerous complication is redeemed by immense advantages.

In the steam locomotive the transmission of the mechanical power is obtained only through a combination of special adjuncts, of piston rods, cranks, and other stiff connections, which are, by an inevitable fatality, only put in motion with continuous elastic reactions and terrible jerks. Hence those serpentine torsions, those trepidations, all those disturbing motions known in the slang of technical men under the expressive names of "lacet" (side-rolling motion of cars) and of "galop" (gallop) which damage the strongest cars, hammer, pull out of place, and disjoint the rails which are soon clipped and twisted as common pieces of brass.

In the electric locomotive, on the contrary, the current moves the wheels through small dynamos connected directly with the axletrees, which, by

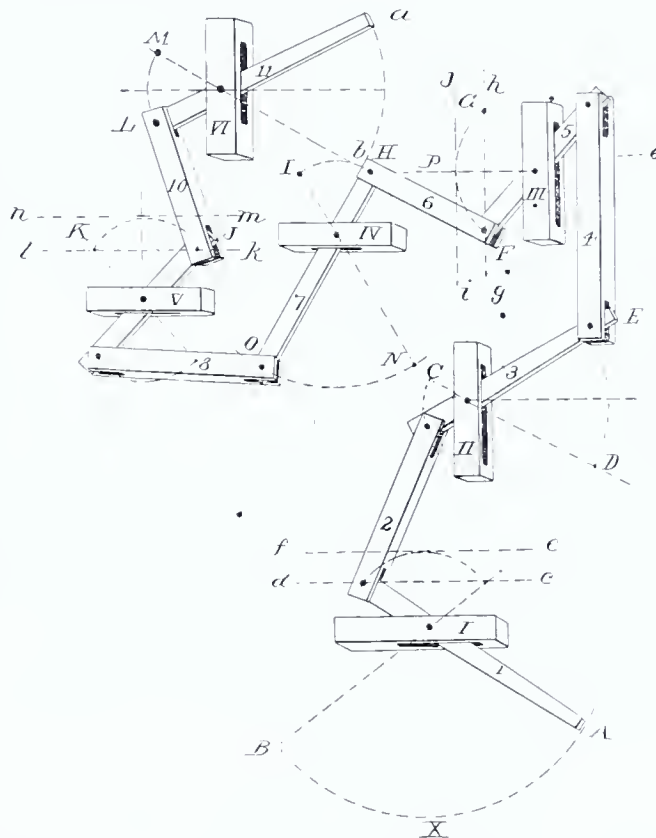
reason of being all motors, create the maximum of adherence. No more jerks, no more destructive poundings, no more undulatory vibrations; consequently, the train runs smoothly and steadily and the road itself will last twice as long.

Consider also that the electric current, instead of being distributed through heavy, cumbersome, and oscillatory pieces of machinery, is conducted through small wires liable to pass everywhere, to be given all the shapes, to be bent at will, and thus permits us to decrease the diameter of the wheels (and, as a

matter of course, to lower the center of gravity of the system), to construct the locomotive as an ordinary common car, to develop indefinitely the production of the motive power, to convert all the axletrees into motors; finally, to increase in untold proportions the stability, suppleness, and power of the engine, without endangering, but, on the contrary, improving, its manageableness.

Link or Lever Motion.

The accompanying illustration represents, what the inventor, Mr. J. A. Johnson, of Holmes City, Minn., is pleased to call a Link or Lever Motion.



While it may not possess much practical merit it is, nevertheless, a novel and interesting mechanical contrivance.

It contains 11 links or levers which are so arranged that when lever 1 is moved from A to B and back again once lever 11 moves at the same time from A to B and back again eight times, lever 7 four times, and lever 3 two times forth and back.

This mechanism consists of eleven links joined

together end to end as seen in the cut. Every other link is pivoted to a block, and every other of these links are pivoted so as to make one end long and the other short, while the others are pivoted midway between the two ends. The blocks I, II, III, IV, have a certain relation one to the other. If a straight line be drawn lengthways through block I and other lines are drawn the same way through blocks II and III by extending these lines so that the line through block I will meet with and cross the two lines drawn through blocks II and III, these two lines will be perpendicular to the line through block I and will be parallel. Lines drawn through blocks IV and V in the same way will be parallel and also parallel to the line through block I, but perpendicular to the lines of blocks II and III. In the same way it will keep on no matter how many blocks are added.

Let us now notice how the speed is multiplied through the links when set in motion. By moving lever 1 from A to X it will be in straight line with connecting link 2 and their joint pin will have reached point y on line e f. Thereby lever 3 has changed position and is in line with C D: lever 5 has also moved from F to G. But while lever 5 has moved from F to G lever 7 is moved from O H to N I and back again to O H, because when lever 5 was half way between F and G it was also in straight line with connecting link 6 which had then reached the extreme outward limit of its movement; wherefore when lever 5 continues to move toward G lever 7 returns to its former position. This has caused lever 9 to move from J to K and back again to J, but as lever 9 is one of the multiplying levers, as is also lever 5, it has caused lever 11 to move from L A to M C and back again twice. Thus while lever 1 moves from A to X lever 11 moves forth and back twice: therefore while lever 1 makes one half sweep lever 11 makes two sweeps and back, and while lever 1 makes its full sweep from A to B lever 11 makes four sweeps forth and back and by the time lever 1 gets back to A lever 11 will have moved forth and back between L A and M C eight times. During the same time lever 7 has moved forth and back four times, and lever 3 two times. Levers 1, 5 and 9 are multiplying levers so that when lever 1 moves forth and back once lever 3 will move forth and back twice, causing lever 5 to move forth and back twice also. But by its moving twice lever 7 is caused to move four times forth and back. Thus it is seen that every multiplying lever transmits to the next lever ahead double the speed it receives. It takes 4 links and two blocks to form a division or section of this mechanism. By adding such a division to the above division it would double the speed of lever 11 so that the last lever, which would then number 15, would move forth and back 16 times, while lever 11 moves 8 times and lever 1 moves forth and back once. In the same way the speed is doubled for every division added. The links or levers are of three different kinds, viz: the connecting links 2, 4, 6, 8 and 10, are all to be alike. The multiplying levers are 1, 5 and 9. Lever 1 is also a multiplying lever, but as it is the first one it is made longer at one end. These are also to be made the same length, as the long and short end levers, as 3, 7 and 11. It is also worth noticing that the connecting links have even numbers as 2, 4, 6, and that other multiplying levers have every other odd number beginning with 1, as 1, 5, 9, and the other levers have the other odd numbers as 3, 7, 11. By connecting the last lever to the crank of a wheel it will revolve and make one revolution for each stroke forth and back of the lever. Mr. Johnson made this piece of mechanism about 14 years ago, and has since that time had a working model of hard wood.

Inventor's Difficulties.

The Cycle Trade Journal very truly says:

Many and varied are the difficulties which beset the path of the present day inventor. Only too often, at the very commencement of his inventive career, he is unfortunate enough to fall into the hands of a certain class of patent agents, whose object in life is to extract from the pockets of the oft-times excitable and pliable clients as many fees as the depth of their pocket will allow.

It is with a view of warning inventors of existing pitfalls that THE INVENTIVE AGE has undertaken the exposition of "patent sharks" and irresponsible "patent brokers." And for this reason the AGE should have the hearty and substantial co-operation of American inventors and manufacturers.

MANY bicycle riders have wondered why hills are much easier to ascend in the dark than in the daylight. The simple explanation of this curious fact, as given in the Bi-News, is that "what the eye does not see the heart does not grieve over. The brain waste does not go on so rapidly when the eye sees little or nothing to waste it by worrying about what has to be done before the steep is conquered." The writer adds that if a rider will select a hill just beyond his powers and "have a shot at it when he can see only a yard or two before him," he will find that he can surmount it with ease.

THE INVENTIVE AGE has made arrangements with Bubier's Popular Electrician, whereby it can furnish both THE INVENTIVE AGE and Electrician one year for \$1.50.

PATENT DECISIONS.

BROWNING *vs.* COLORADO TELEPHONE CO.

This case was originally a suit in the Circuit Court of the United States for the district of Colorado, by Frank T. Browning, administrator of the estate of John Lynch, deceased, against the Colorado Telephone Company, for infringement of a patent granted to Lynch January 22, 1889, and numbered 396,407. The patent was granted for an improvement in conduits for electric wires, and consisted essentially of a rectangular terracotta conduit-pipe having partitions made in one integral piece by forcing, while plastic through a die, and simultaneously burning it. Several defenses were set up by the defendants, but the bill was dismissed without considering but one. That was the question of patentability. The court held that the patent was void for want of patentable novelty, and the bill was therefore dismissed, with costs.

JOHNSON *vs.* OLSON.

This was a suit in equity by Jesse Johnson against Olaf R. Olson, for infringement of patent No. 452,553, granted to Johnson for improvements in excelsior machines. After carefully considering the testimony and facts in the case the court held the patent to be void for want of patentable novelty and invention. Therefore, the bill was dismissed for want of equity, and at the complainant's cost. This case was also decided without the consideration of the other grounds of defence set up by the defendants.

WALL *et al vs.* LECK.

This was a suit at law by W. B. Wall and others against Henry Leck, for the infringement of letters patent No. 445,342, issued January 27, 1891, to W. B. Wall, M. S. Jones and A. D. Bishop, for a process of fumigating trees and plants. The defendants demurred to the bill, declaring that the patent was void for want of novelty. This the court sustained and held that the suit should be dismissed without further proceedings, since the fact of the invalidity of the patent was so flagrant that evidence could not help it. The case was therefore dismissed.

KRICK *vs.* JANSEN.

The bill of William C. Krick, against Edward Jansen for the infringement of patent No. 408,416, was dismissed by the U. S. Circuit Court of Appeals, Second District, on the ground that the invention of the patent was not possessed of patentable novelty. The patent was for improvements in floral letters or designs; and the bill was originally filed in the Circuit Court of the United States for the Southern District of New York and appealed to the Court of Appeals. The court below declared the patent valid and adjudged that the defendant had infringed. As stated above, however, this was not accepted by the court of appellate jurisdiction and the bill was finally dismissed with costs to the complainant.

MILLER *vs.* MURRAY, MILLER *vs.* DONOVAN *et al.*

These are applications at final hearing upon pleadings and proof for the usual decree of injunction and accounting in the suits in equity, brought for alleged infringement of letters patent No. 371,090, dated October 4, 1887 and No. 459,098, dated September 8, 1891 both issued to Henry J. Miller, the complainant, for improvements in road carts. The case came before the U. S. Circuit Court, Southern District of New York; and that tribunal declared that the former patent was valid, with certain restrictions. But since these were not embodied in the device used by the defendants, the bill as to this patent was dismissed. As to the remaining patent No. 459,098, the court declared that claims 1 and 2 were valid if restricted to certain precise combinations, and that claims 7, 8, 9 and 10 were invalid for want of patentable novelty. This being the decision, the facts of the case were such that the bill as to this patent could not be sustained, so it was dismissed, at the complainant's cost as to both patents.

NEW YORK FILTER CO., *vs.* O. H. JEWELL FILTER CO., *et al.*

This was a suit by the New York Filter Co., against the O. H. Jewell Filter Co., and others for infringement of a patent granted to J. S. Hyatt for improvements in purifying water, and numbered 293,740. The case came before the U. S. Circuit Court, Southern District of New York, and that court declared that the patent was for the method described therein, of introducing a substance to coagulate or separate impurities sufficiently to facilitate their removal by the filter-bed. A disclaimer was previously entered in the case and it became a question as to whether this disclaimer did not so limit the patent as to save the defendants from infringement. The court held, however, that the pat-

ent was not so limited and the bill was sustained. Accordingly a decree for an injunction and an accounting was ordered.

STAHL *vs.* ERTEL, *et al.*

This was a suit begun in the U. S. Circuit Court, Southern District of Illinois, for the infringement of letters patent No. 267,422, issued to A. M. Halstead, November 14, 1882; of letters patent No. 258,295, issued May 23, 1882, to A. M. Halstead, and of letters patent No. 368,249, issued to complainant, G. H. Stahl, August 16, 1887. Other patents were declared on, but in the hearing were withdrawn. The court held that claims 6, 7 and 8 of letters patent No. 258,295 and claim 3, of letters patent No. 267,422, both granted to Halstead were valid and infringed. They also held that the patent to Stahl, No. 368,249, was valid and infringed and in accordance with these findings they issued an injunction restraining each of the defendants from using, manufacturing and selling the invention, making the subject of the several patents, and imposed upon the defendants the usual costs.

FENTON METALLIC MANUFACTURING CO., *vs.* OFFICE SPECIALTY CO.

This was a suit by the complainants against the Office Manufacturing Co.; and the Supreme Court of the District of Columbia rendered a decree in favor of the complainant, upholding their patent, No. 450,124, and referring the case to an auditor, to ascertain the damages to which the complainants are entitled. At this stage of the case the defendants applied for leave to file a supplemental bill in order to introduce newly discovered evidence on the merits of the case. The court held, however, that nothing short of a decision so plainly disposing of the merit in the present case as to make all further proceedings useless, would justify it in reopening the case at its present stage. Therefore, the application was refused.

GAMEWELL FIRE-ALARM TELEGRAPH CO., *et al vs.* MUNICIPAL SIGNAL CO.

This case came to the U. S. Circuit Court of Appeals, First Circuit, on appeal from the Circuit Court of the United States, for the District of Massachusetts; and was a suit brought upon letters patent Nos. 359,687 and 359,688, both dated March 22, 1887, granted to B. J. Noyes, as assignor to the plaintiffs. The court below rendered a decree for the complainant, and the Court of Appeals affirmed this decision, holding the patent to be valid and infringed. In this opinion Judge Putnam of the court, dissented, as to patent No. 359,688, on the ground that the patent was void for lack of novelty in view of the invention covered by patent No. 359,687.

H. TIBBE & SON MANUFACTURING CO., *vs.* MISSOURI COB PIPE CO., *et al.*

This case was a suit on letters patent No. 208,816, granted July 9, 1878, to Henry Tibbe, and was entertained by the U. S. Circuit Court, Eastern District of Missouri, Eastern Division. The invention was a corncob pipe having its interior interstices filled with a plastic self-hardening mass which rendered the pipe durable and efficient; and the court held the patent was valid and infringed by the defendant's device, which consisted of a mixture of corn meal and shellac for filling the interstices of the corncob. Accordingly a decree was rendered in favor of the complainant.

LEVY *et al vs.* WAITT *et al.*

This case came before the U. S. Circuit Court of Appeals, First Circuit, on appeal from the Circuit Court of the U. S., for District of Massachusetts, and was a suit by Amand Levy and others, constituting the firm of Levy Brothers, against Henry Waitt and others, constituting the firm of Waitt & Bond, to restrain the alleged infringement of the trade mark "Blackstone," as applied to cigars. The bill was dismissed by the court below, and the Court of Appeals affirmed the decision, the grounds for the same being that the action of the plaintiffs was not such as would establish the right to exclusive ownership, in the presence of the adverse rights of the defendants. Accordingly the case was dismissed at the cost of the complainants.

SHOEMAKER *et al vs.* MERROW.

This was a suit by Joseph Merrow, against John Shoemaker and others, for the infringement of letters patent No. 428,508, issued to complainant May 20, 1890, for a "crocheting or overseaming machine." The case came before the U. S. Circuit Court of Appeals, Third District, on appeal from the Circuit Court of the United States, for the Eastern District of Pennsylvania; and that court rendered a decree dismissing some of the defendants, but in favor of the complainant as to others. The Court of Appeals,

however, held that the patent was not infringed by a machine which dispenses with the part known as a "finger," and this being the case the decree of the court below was disaffirmed and the bill dismissed with costs. The "finger" is a device for guiding the cord or thread over the needles, so that it may be intertwined to compose the fabric; and since it was made an essential element of the claim it should be present in the supposed infringing device. On the other hand, the "finger" was absent from the references. Therefore, the above noted decision.

BROWN MFG. CO., *vs.* DEERE *et al.*, BROWN MFG. CO., *vs.* DAVID BRADLEY MFG. CO.

These cases were two suits brought by the Brown Company—one against Deere, and the other against the David Bradley Company, for the infringement of letters patent No. 190,816, dated May 15, 1877, and granted to W. P. Brown, for an improved cultivator coupling. The cases were finally adjudicated by the U. S. Circuit Court of Appeals, Seventh District, to whom they came on appeal from the Circuit Court of the United States, for the District of Illinois. The Circuit Court decided in favor of the complainant, but upon a rehearing on its own motion rendered decrees, in both cases, for the defendants. The complainant then appealed. The Court of Appeals held that if the device of the patent could be regarded as containing any invention at all it must be construed to be limited to the particular form of pipe box described in the patent. Since this was not embodied in the defendants' device, they were declared not to infringe and the decrees below, in each case, was affirmed.

THE NEWARK WATCH CASE MATERIAL COMPANY *vs.* THE WILMOT & HOBBS MANUFACTURING COMPANY.

This is a bill in equity for infringement of letters patent No. 413,644, granted October 29, 1889, to T. Benfield, S. Aufhouser and A. Milne, for a watch protector. The suit was originally entertained by the U. S. Circuit Court, District of Connecticut, and that court declared the patent to be void for want of invention and accordingly entered a decree dismissing the bill. Whether an appeal will be taken, cannot be now determined, but since the case is one of considerable importance the probabilities are that no pains will be spared in having the decision reversed.

WELLS *et al vs.* REYNOLDS *et al.*

Court of Appeals of the District of Columbia; decision dated September 20; appeal from ruling of Commissioner of Patents, in an interference proceeding, the question being as to priority. Syllabus as follows:

Where the invention has been reduced to practice in a positive form under the patent and the applicant has simply filed his application, without doing anything to adapt and render the invention practical, and where he knew of the issue of the patent within a few days after its issue, and made no suggestion that the invention was his, but recommended it to purchases, both orally and in writing, as the invention of the patentee, and where he did not assert any title to it until six months after the issue of the patent and after he had left the employ of the company who owned the patent to do service for a rival company, *Held* that priority must be awarded to the patentee.

PACIFIC CABLE RV. CO. *vs.* CONSOLIDATED PIEDMONT CABLE CO.

U. S. Circuit Court of Appeals, Ninth Circuit; decision dated May 28; appeal taken from the final decree of the circuit court dismissing the bill in a suit brought by the appellant as complainant, alleging infringement by the defendant of Reissue Letters Patent No. 10,681, of date February 2, 1886, granted to Andrew S. Hallidie, for "tramway for curves and cable-grips." Syllabus:

Reissue Patent No. 10,681, dated February 2, 1886, to Andrew S. Hallidie, for tramway for curves and cable-grips, examined and *Held* to be limited in view of the art, to the combination of a separate guide-rail, slot, and cable-carrying sheaves, and not infringed by a guide-rail formed of the lower flange of the slot-iron.

GOLDSTEIN *vs.* WHELAN *et al.*

U. S. Circuit Court, Northern District of New York; decision dated June 20; action brought to restrain the defendants from infringing the complainant's registered trade mark, "Napolean." Syllabus:

Where affidavits are filed which are not entitled in the cause, they cannot properly be considered by the court. (*Buerk v. Imhauser*, 10 O. G., 907; see also *Hawley v. Donnelly*, 8 Paige, 415.)

COLBY *vs.* CARD.

U. S. Circuit Court, Northern District of Illinois; decision dated April 30; infringement on patent No. 373,223, issued November 15, 1887, to E. J. Colby, for

an alleged improvement in toy locomotives. Found for the complainant.

KREMENTZ vs. THE S. CATTLE CO.

Supreme Court of the United States; appeal from the Circuit Court, Southern District of New York; dismissing a bill filed to restrain the infringement of patent No. 298,303, granted May 4, 1884, to George Krementz, for new collar button; decision filed April 10. Syllabus:

Patent No. 298,303, issued May 6, 1884, to George Krementz, for a collar button, examined and *Held* to cover a patentable invention.

In a suit on a patent, when the other facts leave the question of invention in doubt, the fact that the device has generally displaced other devices of its kind on its merits *Held* to be sufficient to turn the scale in favor of invention.

JOHNSON CO. vs. PENNSYLVANIA STEEL CO.

U. S. Circuit Court, Eastern District of Pennsylvania; suit in equity for infringement. Second claim only pressed and decision made thereon. Syllabus:

Claim 2 of Letters Patent No. 367,746, dated August 2, 1887, granted to E. B. Entwistle, for grider-slot rail crossing, examined and *Held* to be void for lack of invention.

EASTMAN CO. vs. BLAIR CAMERA CO.

U. S. Circuit Court, District of Massachusetts; suit for infringement; decision dated June 1. Syllabus:

Patent No. 248,179, issued October 11, 1881, to David H. Houston, for improvements in photographic apparatus consisting in adding a pointer to the projecting end of the reel on which the film of sensitized paper is wound to indicate the position of film, and also fixing a pin in the same reel to perforate the edge of the film, *Held* to be for a patentable invention and not anticipated by a cloth measuring machine, and the first and second claims infringed by a device embodying its essential features.

Patent No. 317,049, issued May 5, 1885, to Walker and Eastman, for an improvement in roll-holders for photographic films, the improvement consisting in inserting a spring in the reel on which the film of sensitized paper is wound, in order to preserve the film under tension, examined and *Held* to cover a patentable improvement and not anticipated by a map-rack, and its third, twenty-six, twenty-ninth, thirtieth, thirty-first and thirty-second claims infringed by a device substantially like it, though modified in some particulars.

EDISON ELECTRIC LIGHT CO. *et al.* vs. BOSTON INCANDESCENT LAMP CO. *et al.*

U. S. Circuit Court, District of Massachusetts; preliminary injunction asked; decision dated June 11. Syllabus:

Claim 2 of Patent No. 223,898, issued January 27, 1880, to Edison, for an electric lamp, is for "the combination of carbon filaments with a receiver made entirely of glass and conductors passing through the glass, and from which receiver the air is exhausted, for the purpose set forth;" and platinum wire is described in the specification as the conductor passing through the glass, and is used in the Edison lamp of commerce. *Held*, however, that as his invention resides in the carbon filament, the other elements being old and subordinate and representing, so to speak, only the environment of the filament, the plain meaning of the language of the claim should not be restricted, but construed to cover all material for this purpose capable of conducting the electric current. *Held*, further, that the patent is for a pioneer invention and entitled to a broad construction, and, therefore, that the claim is infringed by a lamp using a conductor of powered silver, although powdered silver was not known at the date of the patent as a conductor in the narrower art of electric lighting, though it was known as a conductor in the broader art of electricity.

Important Events of the Month.

OCTOBER 2.—The Russian ironclad Rousolka, lost last year in the Baltic Sea with 12 officers and 166 men, was found off the coast of Finland.

OCT. 3.—A tornado at Little Rock, Ark., destroyed \$1,000,000 worth of property and killed several persons. Prof. David Swing, of Chicago, died.

OCT. 4.—Flying Jib, with running mate, at Chillicothe, Ohio, paced the fastest mile ever made in harness, 1.58½.

OCT. 7.—The death of Oliver Wendell Holmes, aged 85, at his home in Boston, was announced. Andrew G. Curtin, war governor of Pennsylvania, died, aged 77.

OCT. 8.—The South Carolina State Liquor Dispensary law was again declared constitutional by the state supreme court. The condition of the Czar is reported as critical.

OCT. 10.—A northeasterly storm along the upper Atlantic coast damaged much property and many were shipwrecked.

OCT. 11.—The federal grand jury at Milwaukee returned indictments against President Debs and 24 other railroad men. An explosion of a bunch of 27 boilers occurred at Shawakin, Pa., killing five men. The papers in a match between Corbett and Fitzsimmons for a purse of \$41,000 and a side bet of \$10,000 were signed—the fight to occur at Jacksonville, Fla., after July 1, 1895. The Japanese score another victory in the capture of Wi-Ju.

OCT. 12.—Two employees of the Bureau of Engraving and Printing were arrested charged with the theft of over 50,000 postage stamps. Train robbers held up a train on the Richmond, Fredericksburg and Potomac railroad and secured a large sum from the express company.

OCT. 16.—Houston, Texas, has a half million dollar fire. Five thousand tons of tin plate was shipped from Swansea to America.

OCT. 18.—President Havemeyer and Secretary Searles, of the Sugar Trust, were held in \$5,000 bonds, when arraigned in the District Supreme Court at Washington, on indictments charging them with refusing to answer certain questions before the Senate investigating committee. The Pullman company declared a dividend of \$2 a share.

OCT. 19.—A man named Searcey and another named Montgomery, charged with complicity in the Quantico train robbery, were arrested.

OCT. 20.—The Panama Canal Company was reorganized at Paris. James Anthony Froude, the historian, died in London, aged 76.

OCT. 22.—Train robber Searcey makes a confession. Bandits held up the entire town of Talala, I. T.

OCT. 25.—New York Democrats express their disgust at President Cleveland's inactivity and failure to say a word for Hill for governor. The Chinese are again defeated in an engagement at Sukochin.

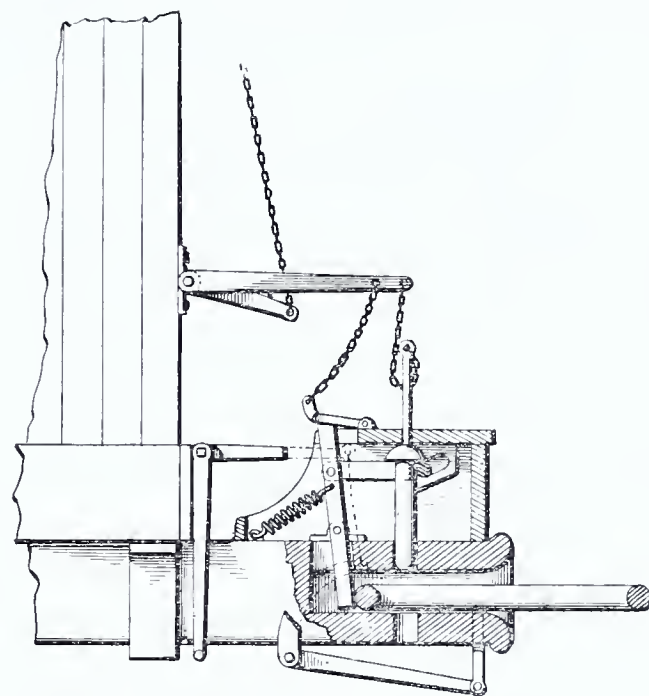
OCT. 26.—Chancellor von Caprivi resigned, creating great excitement in Germany. Prairie fires are raging in parts of Nebraska, doing much damage. The condition of the Czar is worse. The Japs have transported a large army over the Yalu river. Dr. Henry T. Helmbold, the well known patent medicine man, died in the insane asylum at Trenton, N. J.

OCT. 27.—In a hotel fire at Seattle sixteen persons perished.

OCT. 29.—The case of the Czar is pronounced hopeless and his death only a question of hours.

The Lybe Automatic Car Coupler.

The accompanying illustration of the Lybe Automatic Car Coupler shows a very simple and practical appliance for releasing the coupling-pin and adjusting the link without endangering the lives of trainmen or other operatives. The coupler is nicely provided with means for controlling the horizontal position of the free end of the link to enable it to enter opposite drawheads of different altitudes, yet the effective operation of the link lifter, and its marked economy in construction and attachment are the paramount features of the invention. This coupler received the approval of the Master Car Builders' and Master Mechanics' Association at its meeting at Saratoga last June, and has attracted the attention of practical railroad men from all parts of the country. It consists of a casing, which is attached to the drawhead, the chamber of which has a vertical slot in its rear to permit the transverse arms of a reciprocating trip lever to control



push bars. The free ends of these bars engage the projecting ends of a transverse bar which moves in inclined slots in a plate attached to the under side of the lid of the casing. The bar naturally gravitates toward the lower ends of the slot, but yields readily to the push bar and permits the tapering body of the coupling-pin to move upward until the shoulder of the pin passes. Thus the released bar rolls back under the shoulder and holds the pin out of the drawhead. The tripping lever is held back by a spring. When the link enters the drawhead and strikes this lever the push bar releases the transverse bar from its engagement with the coupling-pin and the latter drops into the link, while an open link or hook rides over and drops in the rear of the then drawn-forward lever and securely locks it. A shaft, journaled on the end of the car, and provided on its outer end with two chains—the short one attached to the link and the long one to the top of the coupling-pin—is used for uncoupling, the shaft being supplied with a crank handle. A second lever attached to this shaft can be controlled from the top of the car. The invention is the property of Daniel I. Lybe, of Sidney, Iowa, who is desirous of either disposing of the right for the United States and Canada or organizing a company for its manufacture and introduction.

A GREAT STRUCTURE.

(Continued from 1st page.)

party assembled to return to the city, Congressman Grow remarked that Gen. Meigs had placed the name of Jefferson Davis on one of the inscription tablets, and it is said that Secretary Smith announced that he would order the name immediately removed. This was not done, however, for some time. Later on Mr. Robert McIntyre, who had a contract for completing the structure, called upon the secretary for instructions in regard to the same, and was told that the first thing to be done was to remove the name of Jefferson Davis, and the wishes of the secretary were immediately carried out, and thus the tablet stands today.

Books and Magazines.

The second number of The New Science Review, a quarterly publication conducted by J. M. Stoddart, for many years editor of Lippincott's Magazine, more than justifies the expectations of the most confident friends of the editor. The scope of The New Science Review is best defined by the publisher's note wherein it is stated that "articles taking either side of a question which the higher intelligence and the higher morality of today looks upon as a mooted one, are not only admitted, they are eagerly sought." An unsigned article, "What Electricity Is," in the last number, wherein the author advances the theory that it is simply a form that energy assumes while undergoing transformation from the mechanical, or the chemical, form to the heat form, or the reverse, is calculated to excite a good deal of discussion among electricians and scientists. The New Science Review is published quarterly at 147 North Tenth street, Philadelphia, the subscription price being \$2 per annum.

The Liberty Machine Works, of New York, well known manufacturers of printing presses and printers' supplies, have had interpreted and published in El Amigo del Tipografo, a Spanish magazine, the illustrated article from the April INVENTIVE AGE on "Modern Type Composition."

The field of trade journalism has been invaded again, this time by the Spatula, published at Boston, it is needless to add, in the interest of druggists.

Although two years behind in publication, the annual report of the Board of Regents of the Smithsonian Institution is none the less interesting. Some of the papers describing and illustrating collections in the U. S. National Museum are intensely interesting and instructive. "Scientific Taxidermy for Museums," based on a study of the United States government collections, by R. W. Shufeldt, M. D., is a particularly valuable contribution. The paper is embellished by a hundred or more plates illustrating the progress that has been made in the art of taxidermy.

After five years of labor, with the help of 247 editors, and the enormous expenditure of nearly one million dollars, the Funk & Wagnalls Company announce that the last page of the second, the concluding, volume of the new Standard Dictionary, is now in type. This volume will be ready for delivery in November. The advance orders for this work are said to be phenomenal, surpassing the most extravagant expectation of the publishers. The New York office of the company is at 30 Lafayette Place.

We are in receipt of the Catalogue of the Exhibit of the Pennsylvania Railway Company at the World's Columbian Exposition, with the compliments of Mr. Theo. N. Ely, chief of motive power, under whose direction the great exhibit was made. Visitors at the World's Fair who were attracted to this interesting collection of railroad appliances and data, illustrating the growth and development of railroading in general, and this great railway system in particular, will be pleased to learn that the exhibit is to be left intact. It was sent to the Field-Columbian Museum, of Chicago, by the Pennsylvania Railroad Company, immediately after the close of the World's Columbian Exposition in 1893, and is now installed in halls 41 and 57 in the east pavilion of the Museum building at Jackson Park, Chicago.

The Street Railway Journal made the occasion of the convention at Atlanta last month the excuse for issuing a souvenir number that reflected great credit upon the publishers and that gave to those attending that convention a great deal of valuable information. This issue also marked the tenth anniversary of the Journal's publication. It contained a 16-page article on Atlanta, a 10-page article on the Association, a 30-page article on the street railway systems of the southern cities, and a 20-page article on the history of the street railway industry. All of these were handsomely illustrated—containing over 400 illustrations, among which were more than 125 portraits of street railroad men. The Journal is always handsome, always interesting and always prosperous, but this issue was especially attractive. The excellence of its reading matter and illustrations was equalled only by the artistic display of its advertising pages and its general typographical appearance, which is saying much.

The publishers of Engineering Magazine, determined to maintain that magazine as the peer of all others in its line of trade journals, has inaugurated a "Review of the Industrial Press" department, which is calculated to add to the well deserved popularity of that publication and especially commend it to other trade journals. The publishers have in mind to do for industrial literature all that Review of Reviews does for the political and literary field.

From the University Press, Cambridge, by John Wilson & Son, we have a unique little volume of poems entitled "Songs from Vagabondia," written by Messrs. Bliss Carman and Richard Hovey. The publishers in this country are Messrs. Copeland and Day of Boston. The score or more of songs, as might be anticipated from the title page, portray in a light but exceedingly happy vein the careless life of the vagabond or lover, and involuntary "Roger and I" is recalled as one reads. Other of the songs bear the warmth of some of Swinburne's earlier efforts, and now and then a picturesque glimpse of nature would suggest Longfellow or Wordsworth. The varied versification renders all of the songs attractive, and withal the little book is pleasing in fancy and felicitous in expression. Its binding and typography are antique, and the price is \$1.

The oldest piece of wrought iron in existence is believed to be a sickle found near Thebes. It is about 3,000 years ago.

SCIENCE FOR YOUNG PEOPLE.

Conducted by E. P. LEWIS.

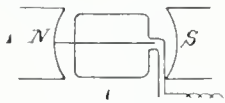
According to the electromagnetic theory of light, which was advanced by the late Clerk Maxwell, light is due to electric vibrations in the ether, the invisible, intangible fluid that we suppose to fill all space. A few years ago Heinrich Hertz, a young German physicist who recently died, proved that electric vibrations obey exactly the same laws as those of light, so that we need no longer doubt that Maxwell's views are correct. When an electric spark passes between the electrodes of a Leyden jar or of an induction coil, there is such a sudden rush of current that a recoil follows—in other words, there is an oscillatory discharge, the electricity rebounding backward and forward many thousands of times in a second. Each oscillation sends out a wave of electricity into the surrounding space, which travels with the same velocity as light—186,000 miles a second. When these waves fall on other conductors they set up currents of electricity in them. This is the way in which electricity is generated by induction. The conductors on which the electric waves fall may be so arranged that their existence may be shown by the production of sparks. In this way Hertz showed that the electric waves could be reflected from metallic mirrors; that they could be refracted, or bent out of a straight line, by prisms of pitch or sulphur, just as light is refracted by glass prisms, and that they could be brought to a focus by suitable concave mirrors or lenses.

* * *

What, then, is the difference between what we call electricity and what we call light? There is really none, except in the effects produced on our sensations. The etherial waves, which produce the sensation of light when they fall on our eyes, are of such a size, or frequency of vibration, that our nerves readily respond to them, while we have no sense organ which enables us to detect the slower impulses of the electrical waves. The wave length of the latter—that is, the distance from crest to crest of the electrical disturbance, is at least several inches when produced by the smallest Leyden jar, while the light waves are only about one-fifty thousands of an inch long. The waves of what we usually call radiant heat are of the same nature, but somewhat longer than those of light, while between these and the shortest electric waves that we can produce, there is an immense gap. If there are waves of an intermediate length—and without doubt there are—we have now no means of detecting their existence.

* * *

An alternating current dynamo sends out waves of electricity, and it is easy to calculate how long they are. Suppose we consider a simple two-pole machine, and, for the sake of simplicity, imagine that there is only one turn of wire in the armature. Suppose the loop starts to turn from the position shown in the diagram. A current will be induced



in the wire as it moves through the magnetic field, and this current will at first increase and then diminish to nothing when the first half turn is completed. Then it is set up in the opposite direction, and finally again dies away as the coil returns to its first position. We have here what corresponds to a crest and a hollow in a water wave. In a certain position the armature sends out the crest of a wave, or the maximum current, through the external circuit, and on returning to that position it sends out a second crest. Now, what is the length of these waves? It is the distance that the electric disturbance can travel in the time taken by one revolution of the circuit—that is, the distance from crest to crest. If the armature turns once every second, the wave must be 186,000 miles long, for that is the distance the disturbance can pass over in one second. If the waves are a thousand miles long, the coil must turn 186 times a second. Of course the external conductor is never so long as this, so the waves simply run round and round the circuit, adding their effects to succeeding waves, but rapidly dying out on account of the resistance of the circuit.

* * *

When electric waves pass through the carbon filament of an incandescent lamp, they meet with far greater resistance to their motion than they do in the copper wire which conveys them there. In somewhat the same way that friction produces heat, the resistance offered to the current causes it to heat the filament. As it becomes warm, its vibrating molecules send out waves such as those radiated by

stoves—waves which will warm but not illuminate. As the vibrations become quicker, shorter waves are sent out, until they are of such length that they produce the sensation of light. Finally, at a white heat, the filament sends out waves of all lengths, the majority of which are useless as far as light is concerned. In fact, less than one per cent of the energy of the current is utilized for illumination. The rest is wasted in the "dark" rays. You can see, then, what an important problem it is to reduce this waste, and what a fortune awaits the one who succeeds in doing it. Among others, Nikola Tesla is working on the subject. His aim is to find some method by which he can produce electric (or, what is the same thing, light), waves of such a length that all of them will have illuminating effect. The dark waves must be entirely gotten rid of. The fire-fly has succeeded very nearly in doing this, for its light has very little heating effect, but the fire-fly has not yet told his secret to man.

* * *

Clay, which exists in large quantities everywhere, is a chemical compound containing a large proportion of the metal aluminum; and yet the latter is still a costly substance in spite of its abundance. The reason is that all the methods of separating the metal from the clay are expensive. Electrolysis, or separating by the electric current, is the method usually adopted. When electricity can be produced more cheaply, aluminum will also become cheaper.

Patent Commissioner Joseph Holt.

The death, recently, of Hon. Joseph Holt brought to my recollection his brilliant and highly creditable administration of the Patent Office, prior to his becoming one of President Buchanan's cabinet—Postmaster-General—and to his appointment to the post of Judge Advocate General of the army.

While Mr. Holt was Commissioner of Patents he made many useful reforms in respect to the question of decision upon invention and patents; and, being a lawyer of the highest type, he grasped the patent system to its fullest range. He regarded the inventor as a person to be cherished, honored and rewarded. Mr. Holt, though a man of large legal and classical learning, and of magnificent bearing, and independent financial resources, never failed to meet the meritorious struggling inventor with a cordiality that did honor to his noble nature and manhood. He believed in construing the law as he found it and not as he thought it should be. On one occasion, about 1859, the important question, "Can a slave take out a patent?" came up before him for decision. He reasoned in this wise: "A patent cannot be granted to a slave; neither can it be granted to the master, as the master cannot make oath of invention." In his decision he said: "The slave being incompetent to take the oath and incompetent to receive the patent, there is manifestly presented *casus omissus*, which legislation alone can supply." The application in this case was filed by Oscar J. E. Stuart in behalf of his slave. The opinion is found in letter book 47, p. 207, U. S. Patent Office records. The present status of all colored citizens entitles them to the grant of patents for the products of their brains, and there is no longer a necessity for others besides themselves to apply for or receive the patents. Every one should rejoice at this advanced step.

Judge Holt made a decision in the Goodyear vulcanized rubber extension application that shows that he was a master in rhetoric as well as common and moral law. This decision ought to be read by every young man of our law and scientific schools. In it the inventor will also find a true friend, but the patent pirate an implacable enemy and opponent. The decision contains the entire history of Mr. Goodyear and the invention of vulcanized india rubber. In the decision of Mr. Holt, found in book No. 3, page 409, year 1858, U. S. Patent Office records, are these words:

Important, as are to the parties to this issue, the immediate consequences bound up with it, they are insignificant, indeed, as compared with the value to the public of the principle involved.

From the very foundation of this government it has been the settled policy to secure a just reward to all inventors; and it is to the inflexible maintenance of this policy that we are indebted to the unparalleled advancement, which, as a people, we have made in the useful arts. All that is glorious in our past or hopeful in our future is indissolubly linked with that cause of human progress of which inven-

tors are the preux chevaliers. It is no poetic translation of the abiding sentiment of the country to say that they are the true jewels of the nation to which they belong, and that solicitude for the protection of their rights and interests should find a place in every throb of the national heart. Sadly helpless as a class, and offering in the glittering creations of their own genius the strongest temptations to unscrupulous cupidity, they, of all men, have most need of the shelter of the public law, while, in view of their philanthropic labors, they are, of all men, most entitled to claim it. The schemes of the politician and of the statesmen may subserve the purposes of the hour, and the teachings of the moralists may remain with the generation to which they are addressed; but all these must pass away, while the fruits of the inventor's genius will endure as imperishable memorials, and, surviving the wreck of creeds and systems, alike of politics, religion and philosophy, will diffuse their blessings to all lands and throughout all ages. However much the seeming perplexity in the applicant's accounts may expose him to cavil and to that vituperation which is so ready a coinage of professional zeal, and however short some of the points in the case may fall of that complete elucidation which could have been desired, there is one fact established beyond all controversy and which stands out from this record with painful prominence. At the close of all his toils and sacrifices, and of the humiliations he has been called on to endure, this public spirited inventor, whose life has been worn away in advancing the best interests of mankind, is found to be still poor, oppressed with debt and with the winter of age creeping upon his shattered constitution. It is perfectly manifest that this is in no degree the result of vice or of improvidence on his part; but it is an inexorable consequence of the impoverishing experiments, inseparable from the prosecution of his great enterprise, and with that prolonged and exhausting strife in which unscrupulous men have involved him. He now begs of that country to which the energies of his manhood have been so freely and so faithfully given, that he may be allowed to enjoy for a few years longer that precarious protection which our most feeble and imperfect laws extend to the fruits of intellectual labor; and were the appeal denied, I feel that I should be false to the generous spirit of the patent law and forgetful of the exalted ends which it must ever be the crowning glory of those laws to accomplish. The patent will therefore be extended for seven years from the 15th of June, 1858.

The writer had conversations with Mr. Goodyear in Washington, while his application for an extension of his patent for seven years was pending, and while, indeed, he had an anxious mind and a frail body, his eye was luminous and his intellect clear. He truly was a man of genius, as the manifold applications of his vulcanized rubber invention, made and patented by himself, attest.

On another occasion Judge Holt made a decision, found in volume 3, page 27 of the Patent Office records, in which is found the following:

It is due to the dignity of the subject, and the generous spirit of the constitution, that the patent laws should be liberally construed—having ever in view the great end they were designed to subserve. They were enacted for the government of an office whose range of action is altogether above the barren fields of mere technicalities. That office, in my judgment, would be forgetful of its mission and disloyal to one of the highest interests of humanity were it to permit itself to be entangled in a mesh of mere words, or palsied by doubts born of intricate metaphysical disquisitions. It has to do with the substance of things, and to deal with the earnest, ingenious, practical intellect of the age, and it should deal with it frankly, not perplexing and discouraging inventors by subtle distinctions, but kindly taking them by the hand as the benefactors of their race, and strewing, if possible, their pathway with sunshine and with flowers.

If ever a man deserved to be thanked and remembered for the good he has done to the patent system and to inventors, that man is Joseph Holt, whose memory is sacred to the writer.

ROBT. W. FENWICK.

It is estimated that the Chicago drainage canal, when completed, with its capacity of 10,000 cubic feet per second, will lower the level of Lake Michigan four or five inches, but Lake Superior will supply the deficiency, as its level is twenty feet above Lake Michigan.

What is understood to be the heaviest and the largest log of wood that has ever been shipped by sea was landed recently at Liverpool, England. It was brought from the west coast of Africa, and weighed no less than fifteen tons.

THE INVENTIVE AGE for one whole year, sent to any address for \$1.



Advertisements inserted in this column for 20 cents a line (about 7 words) each insertion. Every new subscriber sending \$1.00 to THE INVENTIVE AGE will be entitled to the AGE one year and to five lines three times FREE. Additional lines or insertions at regular rates.

FOR SALE.—State Rights to Patent Steam Flue Cleaner. Costs 25 cents to manufacture; hundreds sold in Ohio at \$10.00 each. Copies of recommendations furnished prospective purchasers. Address, T. W. McDougal, 50 Hamilton Ave., Chicago, Ill.

FOR SALE.—Or trade, Patent No. 524,065, issued August 7, 1894, on Journal Bearing, being a simple mechanism comprising an upper and lower member, the latter being provided with recesses for retaining balls, yieldingly supported therein for the shaft to rest upon. Undoubtedly the best journal bearing ever devised. A good opportunity for some one; sale or trade. Address, Daniel I. Lybe, Sidney, Ia.

FOR SALE.—Patent outright, or state or county rights—patent granted Jan. 17, 1893, on Rain (or Mud) Skirts; sickness is reason for selling. Address, Patent Rain Skirt Co., 828 Vilet St., Milwaukee Wis.

FOR SALE.—Patent No. 489,554; A Milk Can which under air pressure prevents the milk from churning while in transit. Milk dealers should have this milk can. Address, James Cantwell, P. O. Box No. 409 Washington, D. C.

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FOR SALE.—Cheap if patent is sold at once, patent No. 524,206. The greatest thing on the market; oil or liquid measure and filler; does away with measures and funnels. A fortune in it; unlimited sales. W. Keepers, Philadelphia, Pa.

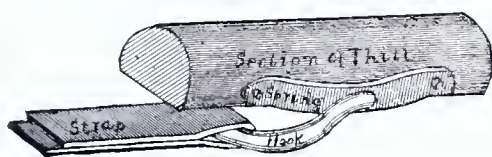
FOR SALE.—Patent No. 509,673; Step or Extension Ladder; sells on sight; change made in a moment; strong, light and durable. No ropes to wear out, nor springs to loosen. Town, county or state rights for sale. Exclusive territory given. Address the inventor, W. J. Osborne, Sonora, Steuben Co., New York.

FOR SALE.—Patent No. 522,202; Hand Truck; a pivoted toe-section connected thereto and means for operating it. The best hand truck ever invented. Will send copy of patent and specifications to any one desiring to investigate a good thing with a view to investment. Will sell patent on good terms. Address, Joseph Frenette, Chippewa Falls, Wis.

FOR SALE.—My patent, No. 523,388, anchor for check-row planter. Address, J. Valentine, Aplington, Iowa.

FOR SALE.—Street Car Motor; Patent No. 524,961, issued August 21, 1894. Correspondence solicited. Address, W. H. H. Stineman, Hicks Mill, Md., or Edward I. Clark, 110 St. Paul street, Baltimore, Md.

FOR SALE or royalty, patented May 29, 1894, No. 520,612 Unique Thill Strap Hook or



Holdbac Fastener. Write Wm. Rice, Rome, Pa.

FOR SALE.—Outright or State rights, patent granted September 26, 1893. No. 505,610, Improved Fruit Drier; thoroughly tested, good testimonials. Address, A. Jones, Pratt and President Sts., Baltimore, Md.

FOR SALE.—Patent No. 454,254, on toy belonging to the "puzzle" family. A fine opportunity for some person or novelty manufacturer. Only \$150 and royalty if taken at once. Max Cohn, 828 Vilet St., Milwaukee, Wis.

FOR SALE.—Cheap; the patent on Fence Building Tool—all east of the Mississippi river. It is a combination post hole digger; the handiest tool out. Write for particulars to J. W. Brennaman, Abilene, Kansas.

FOR SALE.—Two recent valuable patents for Illuminated Revolving Day and Night Store Window Lantern; very practical for introducing and pushing any kind of business, especially in the way of novelties. Owing to pressure of other business patentee will dispose of both patents at a very small price. Address,

the sole owner and patentee, Louis Knh, Sioux Falls, South Dakota.

\$100 cash will buy Patent No. 497,901—Expandable Form for Paper Box Making. Address, Wm. Watt, 43 Purchase St., Boston, Mass.

BUSINESS SPECIALS.

Advertisements under this heading 20 cents a line each insertion—seven words to the line. Parties desiring to purchase valuable patents or wanting to manufacture patented articles will find this a valuable advertising medium.

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WANTED.—A partner with \$250 to invest in a new patent Excelsior Machine. There's merit in it. Address James Worth, Union City, Ind.

WANTED.—Manufacturers and dealers to know that I want to sell, on commission, their small, useful Patented Novelties that will pay good profits. All reliable firms should write me. I want exclusive right. Can give reference. Address, W. H. Dillon, Virginia, Illinois.

New Inventions and Discoveries.

It is said that a Brooklyn mechanic has invented a machine for making binding twine which will greatly reduce the cost of manufacturing.

It has been demonstrated that aluminum can be soldered by first copper-plating the surfaces which are to be joined. It can then be soldered in the ordinary way.

The Committee on Science and Arts of the Franklin Institute have announced the awards of the John Scott Legacy Premium and Medal to Clement Payen for the invention of the chloride electrical storage battery and to Alexander J. Wurtz for improvements in lightning arresters. These awards are given wholly upon the merits of the inventions and without the knowledge of the parties interested.

A typewriting machine attachment for writing and translating messages in cipher, has been patented by Richard Harte, of Croyden, England. A set of tablets connected by flexible tapes, fixed at the ends to a common frame, is used; the tablets bearing signs or characters corresponding, according to any pre-arranged system, to the signs imprinted by the operation of other than the keys to which the tablets are respectively applied.

At the works of Chas. Camwell & Co., Sheffield, England, the bullet proof shield invented by Capt. Boynton was tested. It is only 3-16 inch thick and is said to have proven impervious to bullets fired from a Lee-Mitford barrel at 30 yards distance. The shield is made from specially prepared chrome steel.

A new safety appliance, the invention of M. E. Boulton, of Boston, was recently tried on one of the fast Pennsylvania Railroad passenger trains between Pittsburg and New York. It consists of an arrangement to supplement the work of the Westinghouse air brake by heavily sanding the tracks as soon as the brake is applied, and thereby enabling the train to be brought to a standstill at very short notice. It is said that the tests were very successful.

Simon Lake, of Baltimore, claims to have invented a serviceable submarine boat which is capable of being readily submerged to any desired depth and again raised to the surface, and of being propelled either above or below water, as required.

Detectives Needed Here.

Superintendent Chas. Ainge, of the National Detective Bureau, Indianapolis, Ind., announces that two or three capable and trustworthy men are needed in this section to act as private detectives under his instructions. Experience in the work is not necessary to success. He edits a large criminal paper and will send it with full particulars, which will explain how you may enter the profession by addressing him at Indianapolis, Ind.

We have received from Baker & Co., gold, silver and platinum refiners, assayers and smelters, Newark, N. J., a copy of a little booklet, giving valuable data concerning platinum, illustrating the various uses to which the metal has been put. This firm refines or purchases anything containing gold, silver or platinum.

THE INVENTIVE AGE can recommend the "Climax" watch, advertised in another column, as being, undoubtedly, the best stem-winder watch for the price in the market. It is a good time keeper, and either a plain or imitation engraved cases can be had. This watch is fully timed and regulated and fully guaranteed for one year, the same as Waltham or Elgin.

Aftermath.

Two rides for one cent is the result of the street railway war in Savannah, Ga.

In the United States there are 148 foreigners to each 1,000 inhabitants. In Great Britain the proportion is less than 6; in Germany less than 9, and in France less than 30.

THE photograph from which the splendid tone cut on the first page of this number is made, was furnished by E. J. Pullman & Son, the well known photographers, 459 Pennsylvania Ave.

It is said that on 8,000,000 pounds of tin plate accumulated in bond at Baltimore in anticipation of the enforcement of the new duty Oct. 1, the loss to the government was about \$80,000 in revenue.

THE coming report of the State Commissioner of Labor, in Ohio, will show that 2,394 representative manufacturing industries located in 46 cities paid out in wages in 1892 \$50,838,383.41; same in 1893 paid out \$43,903,857.57, a decrease of \$6,933,516.

THE proceedings of the recent meeting of street railway men were covered by many technical journals, but no accounts are so interesting and complete as those in the Street Railway Journal, of New York. Electrical World and Electrical Review are close seconds.

THE official computations of the horse-power of the new battleship "Maine" as developed on her recent trial, have been completed. They give 9,229 as the horse-power of the propelling engines, air pumps and circulating machinery, insuring to the contractors for the engines a premium of \$22,900 or \$100 for every horse-power over 9,000.

WM. REEVES, of Hoboken, N. J., has received a patent on a railway train protecting device; the scheme being to conduct hot water pipes from the boiler of the locomotive to the entrance ways of each car, with perforations so arranged that a spray of hot water can be ejected in the face of undesirable intruders, at the will of the engineer or trainmen.

Electric Flashes.

Governor Northern, of Georgia, in his speech of welcome to the Street Railway Association at Atlanta, said the south had 1,611 miles of electric street railway line completed or projected, requiring an investment of \$71,080,000.

A simple device for electrically regulating the feeding of horses has been patented by Amos Y. Reeder, of Philadelphia. Each of the stalls is connected by a tube to the supply box above, and at the end of each tube is the electric apparatus which controls the flow. This is done by working on two cut-offs, which allow just the right quantity of grain to drop into the feed box. A single touch of a button will feed a stable full of horses. This can be attached to a clockwork arrangement, which will automatically feed the horses at any given time. This device is a great boon to milkmen, bakers and those similarly employed, as it permits them to sleep while the animals are feeding.

It is reported that the firm of Siemens & Halske will build an electric elevated road in Berlin.

Six of Toronto's aldermen are accused of wanting \$12,000 for their votes in favor of the Toronto Electric Light Company's bid to light the city.

Engineer Wm. B. Parsons, after an examination of the street railway systems of London, Glasgow and Paris, reports on the feasibility of the scheme in New York to the Rapid Transit Commission. He believes that such a railway can be safely built, economically operated, and that a pure atmosphere can be secured at all times, and that the architectural skill displayed and the perfection of the lighting system would be such as to overcome all existing prejudice to the underground system.

An electric railway is to be built from Mercer, Cal., to Yosemite, a distance of 70 miles, by G. A. Walkup, of Chicago.

An English inventor, having obtained a patent on a device for varying the candle-power of incandescent lamps, Electricity is moved to comment on the invention as follows: "The fact that an invention to be of any commercial value must fill a general demand, or create the same, is too apparent to require any confirmation, and it is equally apparent that an invention the object of which can be more cheaply and efficiently attained by other means is practically useless and merely represents wasted ingenuity."

There is a sort of dog in the manger attitude on the part of the owners of the Brush storage battery patents. Instead of apparently fighting to keep down improvement on the part of others in this important branch of electrical work, they should go to work, develop these batteries and benefit the public.—*Electrical Review*.

The largest central station in the United States will be that of the United Electric Light and Power Co., of New York, now under construction. The power house is planned for an aggregate capacity of 20,000 horse-power.

Magnolia Metal Co.'s Successful Injunction Suit.

Judge Lacombe, of the United States Circuit Court, granted, on October 29th, 1894, the Magnolia Metal Company an immediate injunction against the Nassau Smelting Co., of New York City (composed of Benjamin and Moses Lowenstein), restraining them from selling a metal called the MONGOLIA metal, which they have been assiduously offering in the New York market and elsewhere, claiming it to be the same as Magnolia metal and confusing the trade very generally with the similarity of the names. The Magnolia Metal Company promise to prosecute anyone to the full extent of the law who infringes in the slightest degree on its patent or trade mark rights.



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Marker, land. S J Conkright.
Mask hoop. W R Baker.
Mats, floors, etc., wearing surface for door. H D Whiteley.
Matress. G S Perren.
Measure, tape. F L Church.
Metal, machine for cutting beveled edges on plate. D Lennox.
Metals, method of and apparatus for electrodeposition of. C R Fletcher.
Milk can. E A Kaestner.
Milk can fastener. G McDermott.
Milling machine. E J McClellan.
Moistening device. T J Close.
Music holder and stand, combined. J Wunder.
Musical instrument. J Dodd.
Necktie. D Sanguinette.
Nipple holder. G F Bard.
Numbering mechanism. M E Knight and C S Gooding.
Nut lock. P T Johnston.
Nut lock. T J Litzinger.
Nut lock. W W Owens.
Oil can carrier. J H Lins.
Ore concentrator. A C Springer.
Ornamenting machine. E A Marsh.
Overshoe seamer. O R Tower.
Ozone, producing. J T Donovan and H L Gardner.
Paints, manufacturing roofing. D L Means.
Paper stock, machine for breaking up strings or balls of. C L Hamilton.
Patterns for cloth, etc., apparatus for cutting. M Cramby.
Phosphorus, making. A Shearer and R R Clapp.
Photographic burnisher. W H Bodes.
Photographic head and body rest. W M Gilson.
Piano action. U G Clark and C Mongan.
Pick. M Hardsocg.
Pipe clamp. C Hall.
Pitman connection. T Regan.
Planter ridging attachment, corn. L Runyan.
Pneumatic cash carrier apparatus. O Ames.
Pneumatic dispatch tube systems, valve for. A W Pearsall.
Pneumatic dispatch tube terminal. O Ames.
Post or column. O Andre.
Power transmitting or driving mechanism. C Pauthonier.
Printing press inking apparatus. R Michle.
Propeller, screw. A W Case.
Pruning tool. G Klinefetter and J W Nash.
Pulley. O W Ketelum.
Pump, rotary. E F Smith.
Rail bender. H W Armstrong.
Railway annunciator. C R Alsop.
Railway conduit electric. J E Toole.
Railway conduit system, electric. W A Butler.
Railway, elevated. J C des Granges.
Railway guard. O Bates and G W Smith.
Railway rail joint. H H Fifield.
Railway rail joints, truss for. W F Dimmick.
Railway switch. E H B Knowlton.
Railway switch. A F Schimmer.
Railway switch. T D Willever.
Railway track switch, electric. A F Schimmer.
Railways, system of electric block signals for. W M Outhbert.
Reel. C S Gooding and W E C Goudey.
Sails, reefing. S G Martin.
Sash holder. J Claypool.
Sash weight. H Marshall.
Saw filing machine. J N Howard.
Sawmills, variable gear for. J T Oberdorfer.
Scale, price. O O Ozias.
Scale, price and weighing. O O Ozias.
Sewing machine. G B Price.
Sewing machine. G H Settini and G Cade.
Shade or globe holder. F Rhind.
Sheet metal, making expanded. J F Golding.
Show case and barrel cover. H Lamb and D J Rex.
Shutter bower. A G Chrisman.
Signal recording device. W H Adkins.
Skate roller. J A Segerberg.
Skate sharpening device. F W Taylor.
Sleigh knee. L L Chadlin.
Slider, potato. C B Struble and C S Turner.
Smelting. W L Anstin.
Snap hook. C N Perkins and J P Scollay.
Sole for slippers or shoes. J K Griffith.
Speed measure for shafting. W Lang.
Spinning frames, separator mechanism for ring. A Hitchon.
Spinning machine roll. J Cain.
Spoon. S H Kimball.
Sprocket wheel. P D Murphy and E Kolb.
Stalk cutter. H W Allen.
Stalk cutter. W R Ustry.
Stamp, self inking hand. S H Leavenworth.
Staple fastener for wooden vessels or boxes. F W Rieley.
Steam engine. J R Pearce.
Steam motor. C E Beaumont and G P Wallington.
Stones of small size for toys, etc., making artificial. F Herimann.
Stove. N Lehmann.
Stove, cooking. S Boal.
Stovepipe joint. M Stehle.
Surgical needle. H A Blanchard.
Switchboards, busy test for multiple. R H Polk.
Telephone transmitter. T McCoubrey.
Thermopiles, apparatus for mounting and operating. M L Severy.
Thermopiles, apparatus for utilizing steam for heating. M L Severy.
Thermostat. L G Rowand.
Thill coupling. W S Hartley.
Thill support. D A Barrackman.
Time recorder, employee's. J S Morse and D R Lovejoy.
Time recorder, workman's. E G Watkins.
Tire, pneumatic. J E Senechal.
Tire, pneumatic. E W Young.
Tobacco or cigar moisture. J A Robinson.
Tobacco pipe. W E Frott.
Tobacco pouch. R Heywood and J H Nunn.
Track signal, electric. C R Alsop.
Transom lifter. W S Robinson.
Trolley wire support or hanger. S C Woodhead.
Trunk. I E Kaufman.
Tag, shaft. J D Harrigan.
Type dressing machine. G, J G, and M O Relfuss.
Type writer cabinet. M Foley.
Type writing machine. J P Smith.
Type writing machine attachment for writing and translating messages in cipher. R Harte.
Valve. K N Harboe.
Valve. G W Van Tine.
Valve and steam chest for engines. E W Harden.
Valve, balanced slide. G Cook.
Valve, float. T J Ravner.
Valve for air brakes, automatic safety relief. J Coppersmith.
Valve gear. G Jalsoviczy.
Vault cover, metallic burial. W Eckels.
Vehicle. L W Hampton.
Ventilating cap. T J Ryan.
Vise. H C Raser.
Voice rectifier. V Carpi.
Vote registering and recording machine. H A Clifford.
Wagon, sprinkling. E T Westerfield.
Washing machine. G Brander.
Washing machine. J D Cavanaugh.
Water meter, automatic. G Chaffey.
Water sterilizing apparatus. A V M Spague.
Water tube boiler. M H C Shann.
Wax for dental or other purposes, metallic covered. A S Rutherford.
Wax product for dental or other purposes. A S Rutherford.
Windmill. F A and F L Franklin.
Windmill. N L Rigby and H B Reeves.
Window frame pulley casing. J H Foote.
Wire coiling machine. G W Crowder.
Wire stretcher. J W Austin.
Wood bending machine. J Dawson.
Wort cooler. H E Deckerbach.
Wrench. F W Nelson.
Wrench. W E Pugsley.
Yoke attachment, neck. H T Richmond.
Yoke center, neck. H T Richmond.
- PATENTS GRANTED OCT. 16, '94.**
Acid, apparatus for making sulfuric. P S Gilchrist.
Acid with an absorbent, phosphoric. G Desamps.
Aging wines or distilled liquors, apparatus for. T R Timby.
Alarm lock for doors, etc. J F Gray.
Ammonium bichromate, making. E A Starke.
Annealing box. W H White.
Arbor press. J H Sheridan.
Asphaltum or bitumen disintegrator. F Walker.
Bag fastener. A Nixon.
Bag for containing granular material. F O Matthiessen and B Arkell.
Bearing, shaft. S H Wheeler.
Beating, vehicle ball. E L Brown.
Belt tightener. B F Radford.
Bicycle. S Scognamiglio and C Dominici.
Bicycle attachment. L A Frankenberg.
Bicycle brake. F J Cole.
Bicycle brake. G E Whitney.
Bicycle driving mechanism. G S Webb.
Bicycle handle, adjustable. E C Woodward.
Bicycle lock. C C Free and N F Heath.
Blue, soluble alizarin. H N F Schaeffer.
Boat. G Rooke.
Boiler. H Tetlow and T Harrison.
Boiler. J Vanes.
Boiler furnace, smokeless. M McCarthy.
Boiler water regulator. J W and H W Fox.
Book holder, open. L L D Elderkin.
Boot, wool or felt. J Pendergast.
Bottle. S Howes.
Bottle corking apparatus. E J Boyd.
Bottle stopper. C DeWitt.
Bottle stopper. A Schneider and D W Bromley.
Box binding machine. A A Wood.
Brick kiln. N Merley.
Brush. C W Roche.
Building construction, fireproof. T Bailey.
Building block. A Federici.
Butter worker. R B Disbrow.
Button. H W Libbey.
Button. P Neidhardt.
Button, separable. J Holmes.
Calendar. W K David.
Calipers. J Bath.
Candy scouring and cleaning apparatus. G Carlson.
Candy scouring and cleaning machine. G Carlson.
Cans, closing. J Banbury.
Car brake, hydraulic. W L Fitzhugh.
Car brake, railway. H Hineckley.
Car coupling. F Schalteke.
Car fender. H B Ogden.
Car safety apparatus, street. J J Andrews and T Mott.
Car sand delivering mechanism, street. A Parrant.
Car signaling apparatus, street. G B St. John.
Car wheel lubricator. J W Reneau.
Carburetor. E M Weste tt.
Card, display. C Hemsheim.
Card support. W F Jones.
Cartridge, fumigating. O S Erickson.
Centrifugal machine. E Levy Sauson.
Churn and butter worker, combined. D W Payne.
Cigar band. C Hemsheim.
Cigar or cigarette. P C Saragata and P Souvazoghi.
Cigar shaping machine. C Hemsheim.
Cigarette or match case. J L Sommer.
Clock, electric. C Gullberg.
Cloth stretching machine. J Muir.
Clothes drier. W H Moseley.
Clothes pin. G W McCoolle.
Coach step. B D Druen.
Coal breaker. E B Coxie.
Coal breaking apparatus. E B Coxie.
Coat. N Schloss.
Coating metal plates, apparatus for. T L Thomas.
Cook for gas stoves, etc. J B Wallace.
Comb. N Rheinberg.
Combining machines, driving mechanism for drawing off rollers of. C Choderton.
Compression tank. G T Francis.
Conduit, underground. J E Edwards.
Conveyer. F G and A C Sargent.
Cooking vessel. J H Wilson.
Cultivator and harrow, combined disk. H L Whittredge.
Card cutting machine. J A Gosselin.
Curling iron 2. M Thomsen.
Cut off and strainer attachment for rain water spouts. A H Barth.
Cut out, multiple safety. J F McLaughlin.
Cutter head for woodworking machines. E C Blaney, Jr.
Cutter or trimmer for wood, leather, etc. J A Hess.
Damper, stovepipe. H W Wilson.
Deck iron. F D Chase.
Dental tool. J G Hollingsworth.
Device for tradesmen's use. T L Bristol.
Door check or closer 2. E I Blount.
Door closer, gravity. M R Hobbell.
Door lock, sliding. W E Johnson.
Door operating device, jail cell. C A Krusch.
Door spring or check. H W Latsson.
Dough moulding or dividing machine. J H Althaus and J Ruckstinat.
Drawing rolls for fibrous material 2. W Huchliffe.
Dredge or other structures, means for supporting. E S Emmett.
Drilling machine. J Sullivan, Jr.
Ear ring. C Babcock.
Electric cable. T J Dewees.
Electric machine, dynamo. E Fawcett.
Electrical conduits, weather protecting covering for. E J Houston.
Elevating apparatus. C W Hunt.
Elevator apparatus. W Hill.
Elevator door operating device. E O Church.
Engraving machine. E Fanshaw.
Expansion bolt. I Church.
Eyeglasses. H E Kirstein.
Eyeglasses or spectacles. W G Beck.
Eyeglasses or spectacles. H E Kirstein.
Eyeglasses or spectacles, bridge spring for. B A Gilbert.
Fan. E S Grauel.
Feather dressing machine. J H McConnell.
Fiber drying machine. F G and A C Sargent.
Fire escape. B Fox.
Fire escape. V Leber.
Fire lighter, automatic. A J Krehbiel and G A Hege.
Fish rod reel. G H Newell.
Fish trap. R J Hodge.
Fish trap. P H Lund, Jr.
Flanger and track clearer, rotary. J S Matthews and A T Doyle.
Floor. R Kuighs.
Floor set. H A Bates.
Floors, construction of fire proof. R Astley.
Flush tank, automatic. W W Ensign.
Fruit gatherer. M Reus.
Fumigator. T A Manahan.
Furnace, traveling floor. F H Richards.
Furnace, traveling grate. E B Coxie.
Furnace, traveling grate 8. F H Richards.
Furnaces, air induction apparatus for. J Mills.
Gas balance for ascertaining specific gravity of gases. M Arndt.
Gas engine. H Voll.
Gate. J M Hurst.
Gear cutter. C M Conradson.
Gear, driving. C Hamaun.
Glass and apparatus therefor, manufacture of wire. J H Lubbers.
Glass tablets, apparatus for manufacturing embossed. J W Bonta.
Glove. F P Merrill.
Gold or silver bearing ores, cyanid and chlorination process for treating. P Argall.
Gore cutting machines. A G Brewer.
Governor. P M Rites.
Governor, centrifugal speed. C R McGahay.
Governor, steam engine. H C Nichols.
Grain binder. G G Hunt.
Grain heater or steamer. J P McAllister.
Graphophone. T H Macdonald.
Grease trap. J Barrett.
Grill wires, machine for twisting and punching. L Kirchbauer.
Grinding mechanism. W H Hill.
Harness attachment. B S Lilly.
Harvester elevator. M Kane. (Reissne).
Hat conformator. S H Altland and S Mayer.
Hay carriers, jack and trip pulley for. W Louden.
Hay elevator. W Louden.
Hay elevator pulleys, means for shifting and securing. J D Swack.
Hay loader. A L Rice.
Heating and water circulating system. H A Spear.
Heliograph attachment. A L Wetherill.
Hinge, gate. L Haage.
Hoe, horse. C Gindler.
Horse blanket pin. G A Wright and M L Jacoby.
Hot air pipe. C Spindler.
Husking machine feed roll. P H Conner and L Clark.
Hydrocarbon burner. B Kamps.
Ice cream cans, protector for tops of. C Nelson.
Ice cream freezer. K C Edmunds.
Injector. P P Hogue.
Journal head for rolls. D L McCorkindale.
Keyboard. Z G Sholes.
Kitchen cabinet. E H Trant.
Knife. E Herrington.
Knitted shirt. L W Groat.
Knitting machine transferring apparatus. H Bonner.
Knob fastener, door. O C Ramsey.
Knob, sheet metal. A T Matthews.
Lamp burner wick adjuster. E A Humphrey.
Lamp, electric arc. A H Moses, Jr.
Lamp, hanging. J H Moss.
Lamp shade holder, incandescent. E A Russell and N W Crandall.
Last block fastener. F E Benton.
Latch and knob, combined. C and G Spengler.
Lath or shingle holder. D C Lyons.
Laths, machine for making metal. A O Wright.
Lathing, metallic. A O Wright.
Leather skiving machine. W Hartmann and J L Thomson.
Leg, artificial. E H Erickson.
Letter box, street. J A Metcalf.
Light indicator. L F Johnson.
Linotype machine. O Mergenthaler.
Lock marking gage, door. F K Etherington.
Locomotive boiler. G A Akerliud.
Loom cloth rollers, mechanism for regulating the movement of. E Kastler.
Lubricator. W P Van Gynslung.
Mail bag. W Brubaker.
Mail bag catcher. H N Fleming.
Measuring machine, cloth. H Minister.
Metal drawing machine. A W Foster.
Milk cooling house. E Meek.
Mitering machine. J Locke.
Mower, lawn. G P Kirsch.
Music leaf turner. C P Brown.
Musical instrument. E Enriquez.
Musical instrument, wind reed. P J Devault.
Name or inscription plate for monuments, signs, etc. R H Follenius.
Neckband clamp. A Conkling and E W Buell.
Net safety. J B Dromgoole.
Non conducting material and forming same. H C Michell.
Nut lock. D D Weissell.
Orange holder. G A Glahn.
Organ, reed. J W Trauer.
Panel chair. D B McHenry.
Paper tubes, etc., coating. M C Stone.
Pedal. J S Copeland.
Piano. M H McChesney and J G Kunze.
Piano action. L A Barber.
Piano action. T S Fischer.
Piano, practice. W O Nisley.
Piling, sheet. J A Wakefield.
Pill compressing machine. R Shoemaker, Jr.
Pillow or cushion. W Vogler.
Plaster, corn. A Klink.
Plating metals with aluminium. E C Proadwell.
Plow planter attachment. J W Grubbs.
Pocketbooks, purses, or satchels, frame for. S Schener.
Primary battery and portable electric lamp. S W Maquay.
Printer's quoin. R Warg and A Lindemann.
Propellers, construction of couplings for screw. J Verity.
Propelling boats, means for. P Higgins.
Pulley block. H V Hartz.
Pump, irrigating. M and J N McCay.
Pump, oil. R O Graham 2.
Rail sanding apparatus. W L Truland.
Railway cattle guard. A J Gwin.
Railway chair. E Nennstiel.
Railway, conduit electric. O B Finn.
Railway rail tie. J C Cowdrick.
Railway signaling, detonator holder or clip for use in fog. J G Dixon.
Railway signaling, treadle for use in. J G Dixon.
Railway switch. E Brombacher.
Railway tie, steel combination. J R Green.
Railway track brace. H Greer.
Railway train protecting device. W Reeves.
Resonator, tubular. E M Gerry.
Rheostat. A J Shaw.
Road machine. J F Kimball.
Roasting furnace. E B Goodwin.
Rock drill. E S Currier.
Roofing plate. P Norton.
Roofs, bracket for staging on shingle. G L Wilder.
Sales recorder, manual. H C Cooper.
Sanding device. J Martin.
Sash fastener. E J Blount.
Sash lock. J A Hasegud.
Scale, micrometer. J D Benson.
Scale, weighing. J Holtzhouser.
Screw driver. M Keehn.
Seat or cushion. W Vogler.
Seeding machine. F R Packham.
Separator. J E Borchard.
Sewing machine shuttle actuating mechanism. J Tripp.
Shaft coupling. A Bolzani.
Shaft support and anti rattler, combined. E E Blackman.
Ship's log. G Thom.
Shoe plate or spoke, sheet metal. W H Buxton.
Shoe string holder. H T Small.
Slat and wire fabric. J S George.
Snap hook. M N Judd.
Snap hook. F and I F White.
Snow plow for street railways. F W Dean and W E Mathews.
Sole rounding machine. L E Ericson.
Spark arrester. H E Bultman.
Spark arrester and extinguisher. H O'Hara.
Speed indicator for shafting. W T Lintner.
Spinning jenny. B Bodell.
Spinning machines, mechanism for actuating roving rods of. G E Chandler.
Stamp mill, ore. J M McFarland.
Steam boiler. G Sewell.
Steam boiler. E Shydecker.
Steam boiler. J E Spanghede.
Steam generator. H E Franz.
Steam or hot water heater. H E Chadwick.
Still for obtaining nitric acid, etc. M Penticite.
Stoppers, manufacture of screw. J J Varley.
Stove. W J Keep.
Stove gas burner. J B Wallace.
Stove or portable warmer, pocket. J T Ellis.
Street sweeper. N B Miller.
Suspenders. L Bloom.
Switch. J G Dixon.
Switch actuating mechanism. S Walker and L Marshall.
Syringe. A L Gray.
Tackle block. H V Hartz.
Tap, ale. S Van Henni.
Teleguide, secret. A D P Weaver.
Teleph. ne call register. W T Gentry.
Thill support and anti-rattler, combined. P H McLean.
Ticket case. T Ratcliff.
Ticket holder. J M Akers.
Tile, roofing. C Lesmeister.
Tile truck. J W Bienz.
Tire heater. C Robinson.
Tongs for handling metal. C J Bagley and L Roberts.
Toy or puzzle. F R Cunningham and G A Hitchcock.
Toy pistol. H D Medrick.
Trance post, spring. B D Druen.
Track raiser. T F Steed.
Tree support, fruit. L W Hihn.
Trolley. W A Bache.
Tug adjuster. F Sherry.
Tug, hame. A L Hill.
Type writing machine 3. Z G Sholes.
Valve and regulator, reducing pressure. E J Wood.
Valve gear. F W Haggar.
Valve gear, engine. R M Fryer.
Vapor face bath. H H Hoge.
Vehicle. J W Cleary.
Vehicle. C W Wilber.
Vehicle wheel. E G Schleicher.
Velocipede. C Byrne.
Velocipede. T B Jeffery.
Velocipede driving gear. W Devoll.
Vessel hull. G T Brewer.
Washing machine. C P Randolph.
Washing machine. W Smith.
Washing machine. W Sweet.
Water heater, cleanser and scale preventer. J J Miner.
Water meter. L H Nash.
Water meter, disk 5. L H Nash.
Water tower. E F Steck.
Wave quieting device. H See and G L Carden.
Weather strip. W True.
Well drilling apparatus. S A Horton. (Reissue).
Wheel. N O Starks.
Winding machine, thread. J W Foster.
Windmill. E C B Touzelin.
Window platform. G W Ousley, Jr.
Window screen. J F Bittle.
Wire apron. F G and A C Sargent.
Wrapping newspapers, etc., machine for. L C Cowell.
Wrench. J M Cochran.
Wrench. A L Winge.
Yoke, neck. J S Brown.
- PATENTS GRANTED OCT. 23, '94.**
Adjustable bracket for shade or other rollers. J A Dwyer.
Air brake coupling, automatic. W M Edwards.
Air purifier, return. J Warrington.
Air sieve, purifier, and dust collector, combined return. A C Brantingham.
Aluminium, reducing, 6. F A Goch and L Waldo.
Annunciator signal. I H Faruham.
Axle box, locomotive. M N Forney.
Baling device. J Fakin.
Bale box clamp. T M Wallace.
Basin plug and overflow, combined lavatory. C H Muckenhirn.
Basket, fruit. J E Asam and F Muhlebeck.
Batteries, manufacturing elements or plates for secondary. H F Kirkpatrick-Picard and H Thame.
Bedclothes holder. C E Muller.
Belt, electric. J Backstrom and F W Johnson.
Bicycle frame. G F Washburn. (Reissne).
Bicycle sled. L Thanner.
Bicycle stand. F H Pierce.
Bicycle support. D Brauer.
Billiard cue chalk. F G Chess.
Blacking machine, automatic electric boot. J O Heinze, Jr.
Blacking machine, boot. J B Sweetland.
Boiler. C Hyde.
Boiler tube joint, sectional. S W Pratt.
Bone cutting machine. A H Chapman.
Book rack, sample. J Reading.
Book support. G Stikeman.
Bottles, device for preventing refilling of. W L Davis and B F Leach.

- Bottles, device for preventing refilling of. F W Johnson.
Box covering machine. J Weber.
Brake. C C Osgood.
Brake shoe clamp. E H Kinnaman.
Brick kiln. G S M Rutter.
Brooder, chicken. F J Wie and.
Buckle. J F Molloy.
Buffing pad holder. A E Perry.
Buggy top support. A N Rooks.
Bug making machine. E E Elder.
Bug stopper. B Rubenstein.
Burglar alarm, portable. L G Larson.
Calculator. W H Clark.
Can filling device. E C Hillyer.
Can labeling machine. F X Gaudrie.
Car brake. G F Steedman and J H Brookmire, Jr.
Car coupling. H Gallagher.
Car door bracket. E A Hill.
Car draw bar, railway. A G Steinbrenner.
Car fender. H P Weale.
Car fender. S D Wright.
Car life guard, street. J F Ryan.
Car motor, electric. N C Bassett.
Car motor, steam. J A Barhydt.
Car seat. M N Forney.
Car ventilator. B F Hughson.
Cars, automatic dump for unloading. C D Matheny.
Cars, method of and means for controlling electric. H P Davis.
Carbon, electric light. E G Acheson.
Carding machine. J T Meats.
Carriage. F N Vanier.
Cartridge loading machines, revolving crimper for. C S Hisey.
Cartridge loading machines, shell carrier actuating mechanism for. C S Hisey.
Cartridge loading machines, shell carrier for. C S Hisey and E S Rice.
Cartridge loading machines, shell feeding mechanism for. C S Hisey.
Cartridge loading machines, shell placer for. C S Hisey.
Cash controlling machine. A Quattrup.
Casting sash weights, device for. A S Hodges.
Castings, chill for making chilled. H Schon.
Cathode, for electrolytic process and making same. E Stouls.
Centrifugal separator. H F M Kayser.
Chain machine. B L Colvin.
Cheese press. C J Lundstrom.
Churn. J A Crim.
Churn. C L Leonard and A Bever.
Churn. M M Montgomery.
Churn. C M Roark.
Cigar vending machine, coin operating. H L Kirtley.
Clamp hook, adjustable. J A P Berg.
Clevis. A Morganfield.
Clock, self winding electric. E G Hammer.
Closet seat. W G Vollmer.
Clothes drier. P J Meslein.
Clothes pin. W D Watkins.
Clutch coupling. T F McGee and E J McCarty.
Coal box, portable. T Bukenhofer and E H Weiss.
Coal drill. P Sauer.
Coin controlled machine. I Richardson.
Composition case. R W Nelson.
Coup, folding chicken. C B Proctor.
Cord, flexible. R Kelso.
Cork cutting machinery. J Lowman.
Corn cutter and dropper. J Stewart, Jr.
Corset 2. J C Andrews.
Corset, abdominal. T S Gilbert.
Crade, child's. W E Phillips.
Current motor, alternating. C T Child.
Currycomb. R W Harde.
Curtain. A M Branshaw.
Dental plate blank, rubber. J Spyer.
Desk or stationary implement. T D Ingram.
Dial sinking machine. G E Hunter.
Display cabinet, ribbon. L Schoolhouse.
Door check. J Wolf.
Door check. H V Wertzberger.
Door check and buffer, combined. J P Neeley.
Door lock, sliding. J A Loewer and J G Sieber.
Draft equalizer. G W Raymond.
Dredging machine. L W Bates.
Drilling machine. C A Bentrup.
Duplex burner. T P Evans.
Dust collector 5. A C Brautingham.
Dynamo, metal brush for. W von Branneke.
Educational appliance. L W Musser.
Electric lighting system. G J and T J Parfitt.
Electric motor or dynamo. C F Daniels.
Electric switch. J F McLaughlin.
Electric uterine battery. C E Hobard.
Electrotype matrices, machine for black leading. O B Beach.
Elevator controller. L W Southgate.
Envelope. R L Dow.
Exhibitor, coin controlled. C W DeKnight.
Feed mill. N P Bowsher.
Fence. J Donnell.
Fence, portable. W M Cook.
Fence, wire. H C Pratt.
Fertilizers, making. E Records.
File case. D A Drake.
Filter. W B Lindsay, W E Towner and A Lowmiller.
Firearms, magazine for breech loading. P Mauser.
Flexible tired wheel. S Elliott.
Floor clamp. M Schlatter.
Fine cleaner. W Jess.
Fluid, apparatus for intensifying the pressure of compressed. C P Higgins.
Finit holder. T Leach.
Finit, etc., machine for sorting or grading. F N Ellithorpe.
Flying pan handle rest. C C Hoyer.
Furnaces, method of and apparatus for extracting moisture from air for blast. J Gayly.
Garbage, treating. W MacDonald.
Garment clasp. D Roth.
Gas engine. F S Mead.
Gas engine. H B Migliavacca.
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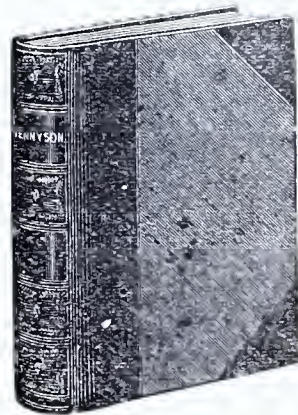
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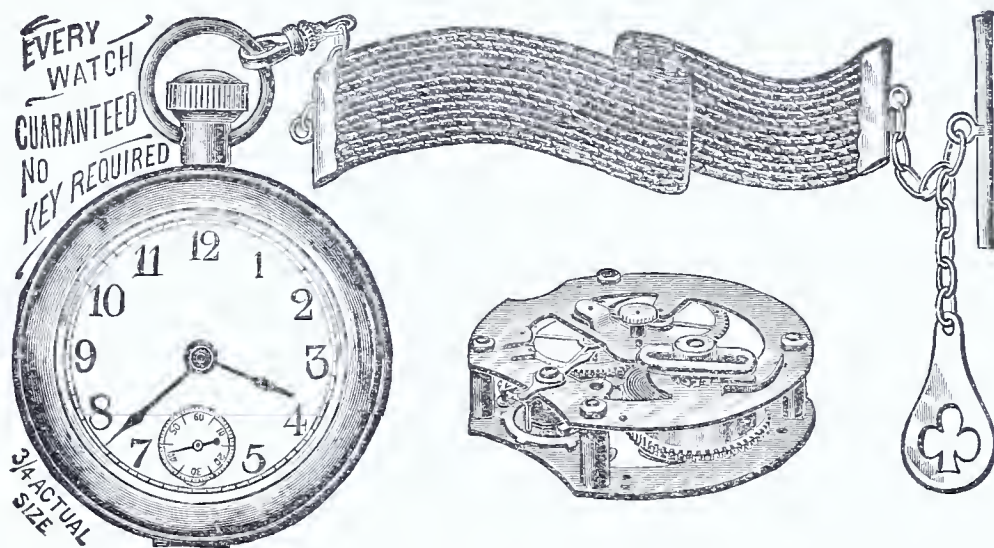
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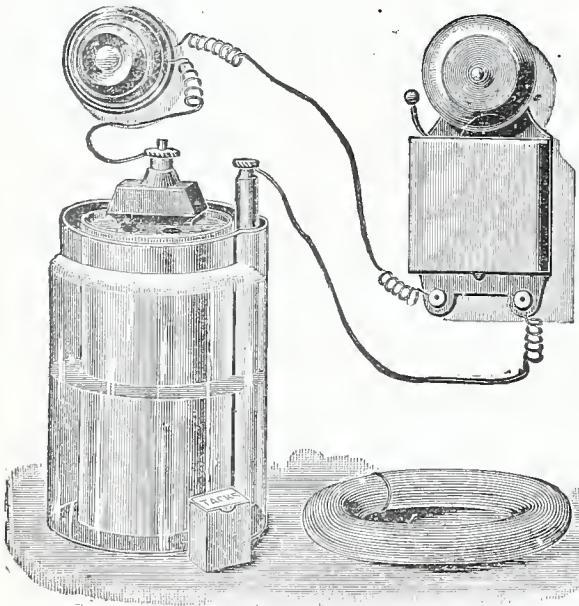
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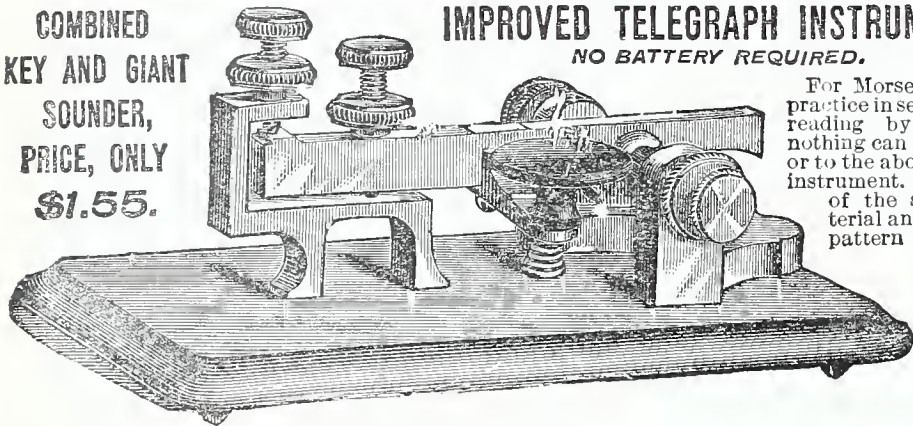
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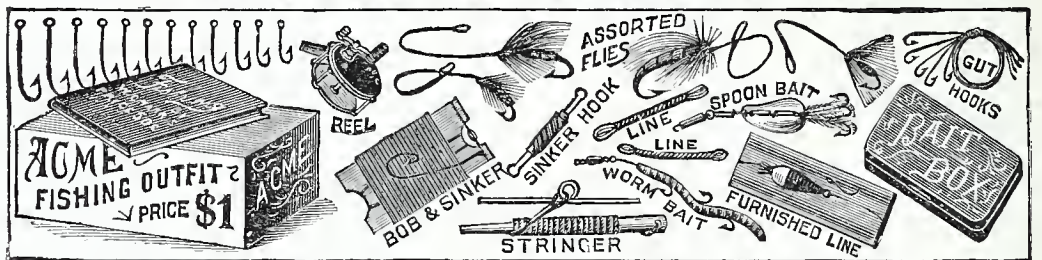


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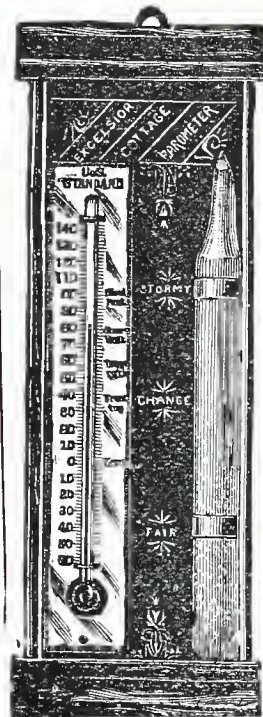
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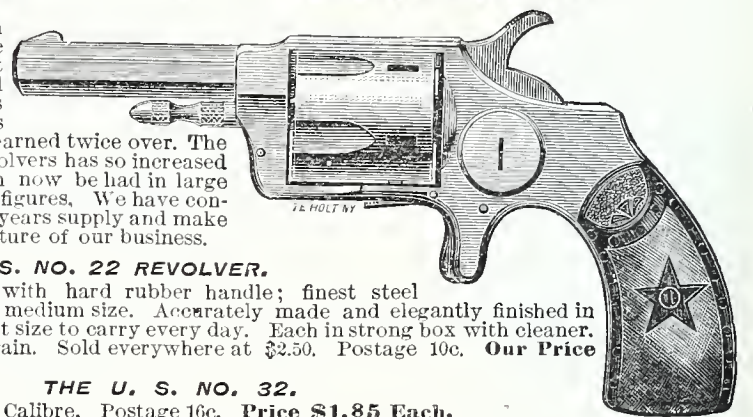
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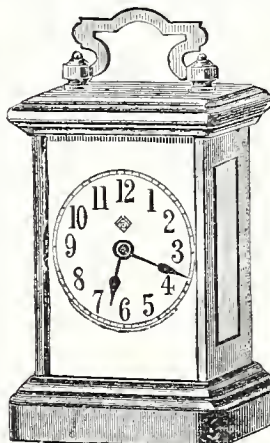
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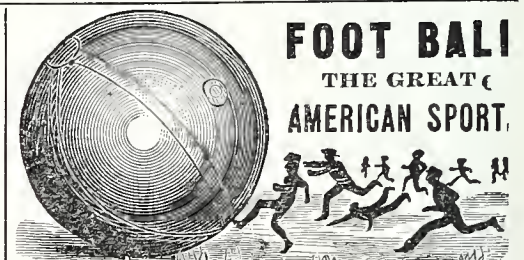


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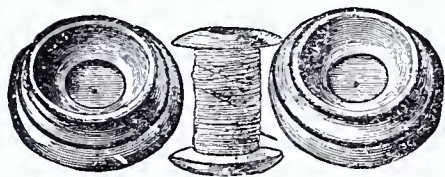
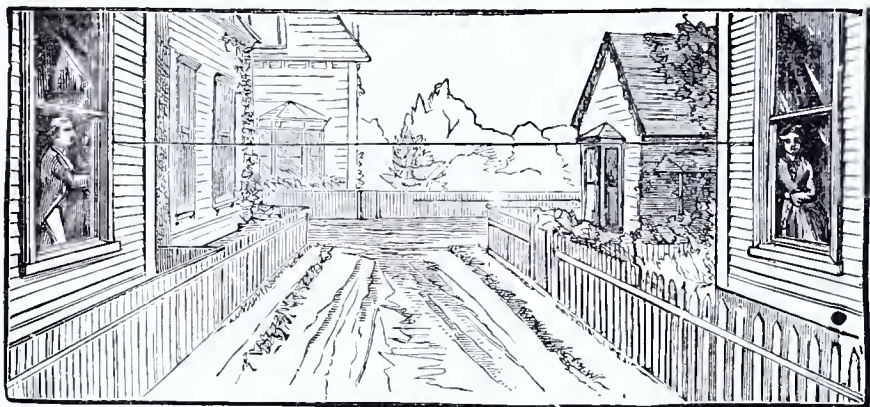


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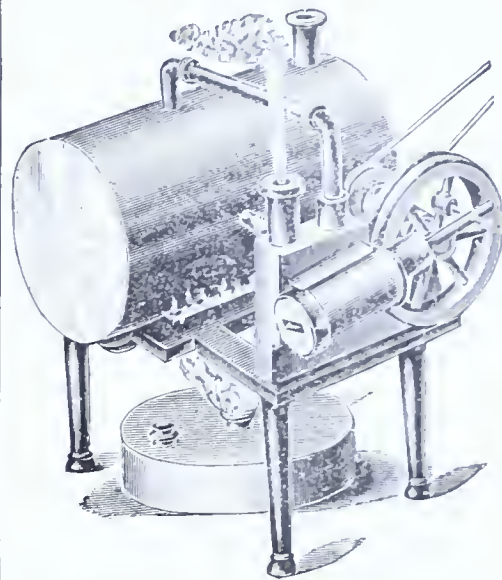
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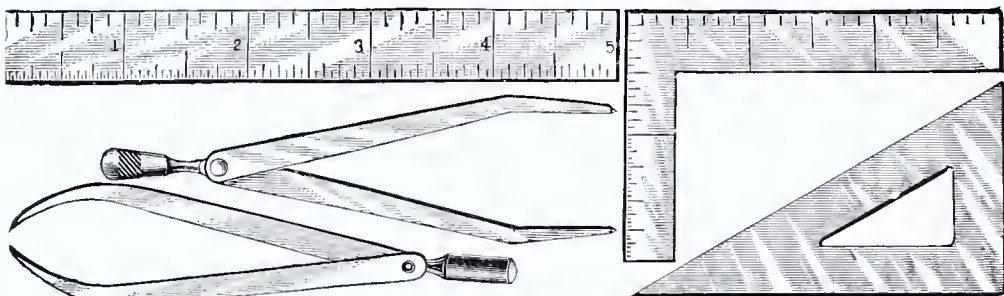
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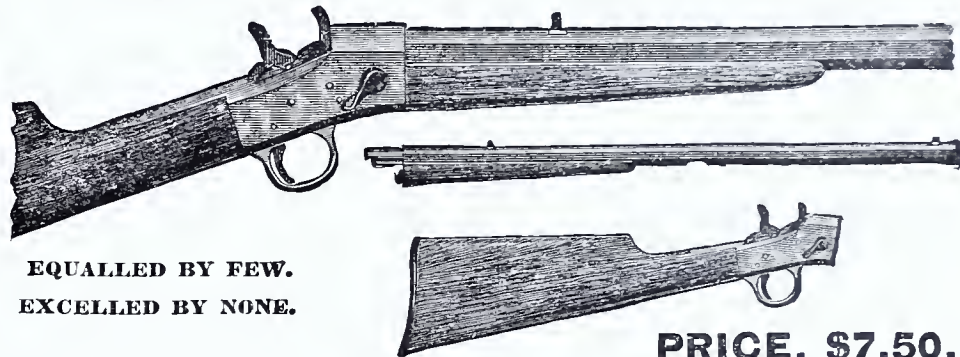
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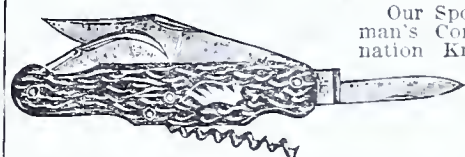


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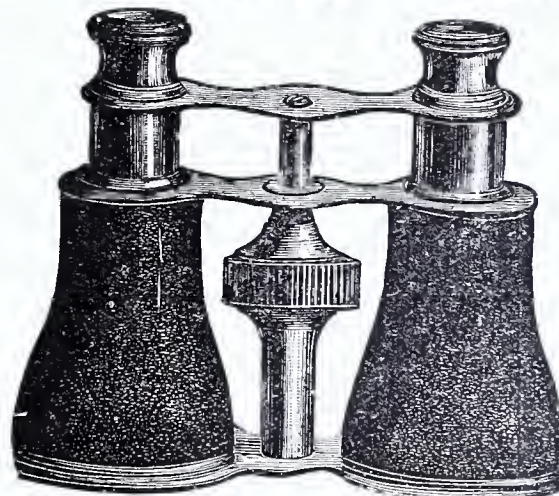
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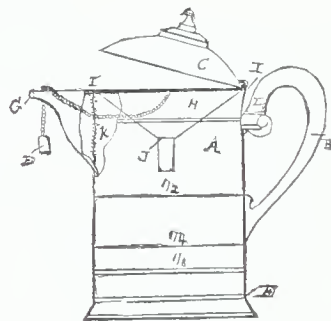
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Balance due Association from agents accounts (secured).....	2,169 80
Accrued interest and premium due and unpaid.....	7,488 50
Other assets (secured).....	12,110 25
Cash on hand.....	140 94
	\$95,699 35
LIABILITIES.	
Paid-up and prepaid stock.....	\$ 1,426 37
Special deposits.....	35,446 80
Monthly stock receipts.....	14,683 29
Weekly dues receipts.....	26,734 31
Loans repaid.....	10,666 58
Balance (profits).....	6,742 00
	\$95,699 35
Amount returned to members	\$112,313 15

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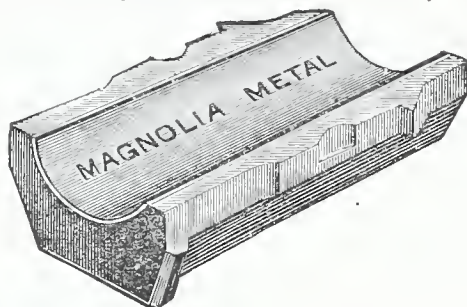
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No. 12.

WASHINGTON, D. C., DECEMBER, 1894.

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An Architectural and Engineering Triumph.

There has just been completed in the city of Washington another great monument to the inventive genius of man. It combines in its ensemble modern triumphs in engineering and pleasing effects in architectural skill.

The illustrations presented herewith are of the Cairo apartment house on Q street, which is the tallest and most conspicuous structure in the city, with the exception of the Washington Monument, the Capitol and the new Congressional Library. Work on this great structure began in March last and only by the use of modern appliances, labor saving machinery, the most perfect organization of labor and promptness in the furnishing of structural material, has the completion of so great an undertaking been effected in such a remarkably short time.

The cut showing the immense steel frame, with brick and stone work partially completed illustrates the manner of building modern steel frame, fireproof buildings, a feature of which is the fact that each story is self-supporting. It would be possible to remove a portion, or all, of the exterior wall of one story without endangering the stability of the other sections of the building.

The steel frame of the Cairo building is 100x122 feet and the total height 165 feet, making a building of 13 stories. The structural steel was furnished by the Carnegie Steel Company, Pittsburg, who make a specialty of "steel frame construction," now so universally adopted by engineers and architects for large buildings in the United States. The steel columns were manufactured in lengths to carry three floors of girders and beams, a method not heretofore used. All the various connections were thoroughly hot riveted together so as to make the whole frame act in unison and the foundations were made of steel beams at right angles to and over each other and so spread as to give equal distribution of the entire weight upon the foundations, the foundation beams being embedded in concrete. Wind pressure has been guarded against by proper bracing between two columns in each bay, one set in each wing, extending from basement to roof.

The name, "Cairo," is not a misnomer. The architecture is of the Egyptian order, conspicuous for its severely straight lines and sharp angles. The carving on the stone work of the front is of the East India style and the details of the hall, reception room, ball room and parlor of first story and din-

ing rooms on top floor are purely East Indian, being copied from parts of temples in Jeypoor, India, and extremely picturesque. The building was designed and planned by Mr. T. F. Schneider, of Washington, who is also sole owner. Mr. Schneider is a young man whose remarkable activity and artistic architectural skill has already won for him much fame. The Senator Sherman mansion, his own palatial residence and other buildings in and about this city

conies upheld by delicate stone columns. At each front corner a square tower-like projection runs the entire height of the big building. At the fourth and tenth stories there are balconies supported by huge griffin-like figures. At the eighth floor additional balconies extend from the corner towers to, and are connected with, the central bays. The principal entrance, reached by a broad flight of steps, is through a wide recessed archway. The interior arrangement of the Cairo is in keeping with the pleasing effect of the exterior. The ground floor contains bowling alleys, laundry, billiard parlors, etc., and the first floor contains the public parlors, reception rooms, drug store, ball room, retiring rooms, reading rooms and office.

The second, third and other floors to the tenth inclusive, are finished in suites of two or more rooms, many of them suitable for housekeeping if desired. The main portion of the twelfth story is occupied by the cafe which in its decorations presents an exceedingly pleasing appearance. The popularity of the roof garden has not been lost sight of in this structure and the gardener's and electrician's art has been brought into play in the production of a resort among tropical plants and fountains that will be pleasing and instructive to the guests of the house. An ornamental iron and marble staircase, supplemented by two Otis hydraulic elevators, extends to the roof garden. In the rear part of the house there is a general freight elevator.

The entire building as lighted only by electricity generated from an isolated plant. Gas is used exclusively for the cooking ranges with which several suites of apartments are equipped.

All the halls are wainscotted with numidian (African) marble and floored with tile. The effect of the marble pilasters and wainscot on the principal story is enhanced by specially designed trimmings. The upper floors are treated with subdued yet tasty decorations.

The building contains 350 rooms, arranged in suites of two or more with bath. On each floor are several apartments arranged with kitchens. A bounteous supply of pure water is obtained for the building by means of an artesian well. In the construction of this building space was sacrificed to comfort so that there are no "inside rooms." Every suite has direct light from the main street and the large open court. The view from the roof garden 165 feet above the level of the street cannot be surpassed. The Wash-

(Continued on page 232.)



A MODERN SKY-SCRAPER, THE "CAIRO," WASHINGTON.

attest his cleverness and originality of conception.

The Cairo is located on Q street, between 16th and 17th and commands a beautiful view of the city and its environs. The front for the first four stories is composed of Indiana limestone; the upper portion a combination of the latter with buff brick, the whole finished off with an ornamental iron cornice projecting five feet beyond the plumb line. In the centre a square projection, 40 feet in width, breaks at the fifth floor into two octagonal bays. These are connected at several stories by elaborately carved bal-

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It is also desired that accompanying each view, there also be sent a complete description of the subject or enterprise, or that the address of some person be given from whom complete information can be obtained.

THE officials in the Patent Office are well up with their business. The applications under examination on November 27th numbered 5,261, of which only 561 were of more than two months standing.

READERS of the INVENTIVE AGE can assist us materially in our warfare on patent sharks by sending in any information they may possess or propositions they may receive from such as they may suspect of humbuggery—and it is safe to question all very closely.

THE question of whether or not an efficient telephone service can be owned and operated without an arrangement with the Bell people, will soon be settled in Washington, where a rival company, said to be encouraged by the Interior Department of the Government, is making an effort to establish itself.

WITH some force it is argued that the Democratic party has an opportunity to at least partially redeem itself before the present session of Congress closes. If it will pass the Nicaragua canal bill the West and South will accept it with gracious thankfulness prompted by an appreciation of duty well performed.

MR. HERMAN HERBERTS of Schenectady, N. Y. has invented an interesting improvement in Electrical Measuring Instruments. The principle upon which his instruments are based is to send the current to be measured in two electrically parallel branches or circuits, around the needle, or armature, of the instrument, thus exciting two distinct polarities in the latter.

TESLA looks forward to sending messages through the earth without the use of wires. He also has great hopes of transmitting electric force in the same

manner without waste. He thinks the important feature lies in determining the exact number of vibrations to the second that will be caused by disturbing the mass of electricity which the earth contains. He says his machine for transmitting must vibrate as often in order to be in accord with the earth's electricity.

FROM far off Calcutta, India, come words of praise for THE INVENTIVE AGE. A subscriber over there reports that Gregory the well known patent shark of Buffalo and Marilla, N. Y., has been attempting to do business in that country. The AGE is complimented for its vigorous stand against patent selling humbugs. Another reader in Melbourne, Australia, also says he wishes to commend the course of THE INVENTIVE AGE in its advocacy of the rights of the inventor.

THE disposition of garbage in New York and other great cities, has become one of the greatest problems to solve. THE INVENTIVE AGE for June last contained an illustrated article descriptive of the new process invented by Mr. J. C. Anderson, the great pressed brick and coke man of Chicago. This invention has attracted the attention of the authorities in all the large cities and last month the Chicago experimental plant was visited by a commission from New York, and the test is reported to have been a signal success.

THE stimulating effect of the result of the November elections is felt throughout the manufacturing districts of the East and a more hopeful feeling seems to prevail all over the country. A general restoration of confidence has set in and there are sure signs of business revival on every hand. The wheels of industry are moving in all manufacturing centers and in the coke regions of Pennsylvania the fires are again burning. While the natural trade conditions have been improved there still exists an over-cautious feeling on the part of capitalists and until there is a more liberal spirit displayed the cry of "hard times" will continue to find favor in many industries where a lack of capital prevents development.

THE probability, amounting almost to a certainty, that higher prices will be paid in 1895 for coke and for Bessemer ores; the fact that up to Nov. 1 stocks of pig iron had been decreasing slightly in the face of steadily increasing output that reached a yearly rate of nearly 8,500,000 tons on that date; the further fact that any noticeable increase of Bessemer pig iron consumption will call into activity furnaces which must have a higher price for their iron than that ruling today—these are the prime elements in any forecast of the iron and steel situation that reaches into the coming year, says Iron Trade Review. Related to these facts is another one—the country's consumption of steel in the past few months has been at a rate never equalled in its history, with the railroads, once a main stay of the steel mills, buying less than in the disastrous second half of '93.

THE patent shark, though not quite so bold as he was a few months ago, before the INVENTIVE AGE began its warfare upon him, is still doing business at the old stand and in the old way. Every mail brings letters from inventors whose experience with the average patent broker have been disastrous. Heeding the advice of the AGE has saved the inventors of the country thousands of dollars. The evidence we are accumulating against the grand army of patent pirates, we hope, will result in the saving of thousands more to those upon whose inventive genius scores of unprincipled swindlers make money. It is indeed a shame, as a foreign correspondent writes, that a field promising so much legitimate reward as patent selling should be so miserably filled. An Australian correspondent in speaking of this matter says: "A positive need exists for reputable professional persons to take up patent selling, and if more of them took to it, it is evident that the more intelligent inventors would place their business with them. By this means the "sharks" would be limited to a smaller field. Never will the

vermin be crowded out, till a more worthy class is crowded in, and when the latter occurs, the fittest will survive. The real salvation of inventors, therefore, is in this direction and in this alone, for so long as reputable persons to sell patents are difficult to find, the inventor will be the prey of those sharks who do occupy the field."

Patent Selling Fakirs.

Under the above heading the Age of Steel has this to say about the question which is just now of so much importance to inventors and patent solicitors:

The inventor who secures a patent finds himself a source of perspiration to the mail carrier and of considerable interest elsewhere. He is advised and admired. Strangers have discovered that his genius is of a high order, and that if placed in proper hands the patent he has secured is a ticket to fortune. It also frequently happens that communications of a like nature from foreign sources, endowed with gilded wafers, slips of ribbon and regal doses of sealing wax tell the same story of admiration and interest. To the average inventor, who is taking his first bath in this rosewater, this sudden blossoming into fame, if a mystery, is yet a pleasing idea. He is naturally anxious as to what he shall do with his patent. In his own hands it can get no further than the tin box in which he keeps it. It may be a triumph of ingenuity, but, kept on a shelf, it is of less value than the old clock that stands by its side.

Genius finds itself in a predicament, and it is just here that the patent-selling fakir comes in as a Samaritan, if he leaves as a shark. In some cases, the inexperienced inventor, having disclosed his weakness and ignorance, is beguiled into paying an advance fee, after which he is left to wonder why no sale is made of his patent. Of course with the honorable patent broker such nefarious practices are unknown. In his hands the inventor has his advance fee rewarded by energetic and conscientious effort to place his invention on the market. It is, however, conceded that there is an urgent need for reform in patent brokerage. It is not to be expected in this business, more than in any other, that dishonesty and fraudulent practices can be entirely eliminated. It is also true that many inventors, by their cupidity, encourage the patent-selling fakir, who seldom fails to find fat returns from such sources. These conditions notwithstanding, it is still a cold fact that many a valuable invention has been practically stolen from the inventor and the bulk of rich perquisites gone into the wrong hands. Manufacturers of specialties are to be found who have surreptitiously obtained the rights of valuable inventions by trading on the business ignorance of their victims. Sinners of this type can never be gotten rid of, but it might be possible to draw a line for the benefit of the average inventor between the legitimate and honorable patent broker and those who are simply patent-selling fakirs.

How Prehistoric Pottery Was Made.

What served people in any line of work before patents? The answer is easy and not to be questioned. It was manual dexterity and bodily knack. I have been looking up the potter's wheel lately and find that prehistoric pottery as well as that of the uncivilized was made without a wheel. But they all get around the work in making it and produce results of marvellous symmetry. The New Caledonians are Oceanic negroes and produce superior ware. The potter uses a common water worn pebble as his wheel. Upon the flatter side he sticks a dab of clay and around this he winds a coil of clay, widening as he goes and smooths the work with his fingers and a flat stone. The under side of the pebble presents at its apex a small surface to the hard ground and turns or pivots with ease. This is a natural potter's wheel on which the workman turns his vessel as he builds it up.

The Nicobar islander gets at the thing in an other way. The operator seated on the ground places before her a board on which is laid a ring or hoop of cocoanut leaves closely woven. Upon this a shallow dish is set lined with a circular piece of plantain leaf that will stick to clay and slip in the dish. A lump of clay pressed on this leaf is the bottom of the vessel which is afterwards built up by the coiling method. The board, the smooth ring, the leaf in the dish constitute the potter's wheel.

Our own Southwestern Indian women work on the bottom of an old pot or basket, or inside of the same. They begin the coil sometimes at first, at other times a starting lump is used, but the old pot or basket are easily turned. The woman at times even walks around her work, a genuine case of getting there though one has to adopt the method of Mohammed.

O. T. MASON.

Names of Patent Solicitors.

Names and addresses of attorneys practicing before the United States Patent Office, carefully compiled by Virginia W. Middleton, for sale by the INVENTIVE AGE; cloth \$1.50; paper \$1 Edition limited.

NOTES AND NEWS.

Some Facts.—Japan has 39,600 physicians; India has 25,000 acres in tea; Europe has 51,801 breweries; London has 803 postoffices; Gold fish are of Chinese origin; Vanderbilt has a \$2,000 piano stool; Suez canal is eighty-eight miles long; Egypt prohibits tobacco cultivation; Paper is made from sunflower stalks.

* * *

Magnetism.—The discovery of magnetism has never been decided. It is claimed to have been discovered by the Greeks and it is also asserted that the Chinese knew of the compass at a much earlier date, yet to the Greeks we owe the name of this science. About the year 1600, Dr. Gilbert, first physician to Queen Elizabeth of England, published his work, "De Magnete" and showed among many other things that magnetic attraction was only peculiar to a few bodies, while electricity was universal.

* * *

A New Use for Dynamite.—Scientists claim that engraving by dynamite is within the possibilities of the future. Recently, while a number of army officers were testing a new dynamite fuse, a small leaf became lodged upon the iron plate at which they were firing. After the explosion, the discovery was made that an exact imprint of the leaf had been made on the iron plate. Other experiments were made by placing leaves and flowers between the cartridges and the plate, each time with the same success. The most delicate line of the leaf could be traced on the plate. Whether this method of engraving can ever be made practicable depends on the reaction which takes place in the iron plate after the explosion has occurred.

* * *

Cryotase.—A new compound substance of this name has been discovered by a German chemist, which, according to "Die Natur," has the remarkable property of solidifying under the influence of heat and again becoming liquid at temperatures below freezing point. It is obtained by mixing equal parts of phenol, camphor and saponine, to which is added a rather small quantity of turpentine. This is the only substance at present known which possesses the property of liquifying when cold and becoming solidified when hot, for, if some substances, like albumen, hardens at a slightly high temperature they cannot be brought back again to the liquid state, even under the influence of a very low temperature.

* * *

A Rainbow Show Bottle.—To prepare this, first ascertain the capacity of the bottle and divide by 7, to find the volume of liquid required for each layer. Then take sulphuric acid to begin with, and tint it blue by the addition of indigo sulphate. For the next layer use chloroform; for the third use glycerine tinted with caramel; for the fourth, castor oil colored with alkanet root; for the fifth, proof spirit tinted with green aniline; sixth, cod liver oil, containing one part of oil of turpentine to 99 of the fish oil; seventh, rectified spirit tinted with violet aniline. Each of these should be poured in through a tube, the lower point of which should be directed against the side of the bottle, so that the liquid may trickle gently over the surface of the layer below it. —*National Druggist.*

* * *

A New Industry.—An industry which promises to greatly increase in the near future has been started in Arizona and New Mexico. Some years ago the discovery was made that the root of canaigre, a plant which grew wild in the woods of New Mexico and Arizona, could be used to advantage in tanning leather. Hundreds of tons of this root were dug and sold. The fact soon became evident that the supply of canaigre was nearly exhausted. The plan of cultivating the plant was then taken up by the farmers of that section. This crop had proved a success, and now many farmers are planting from 1,000 to 1,200 acres of canaigre. In the Pecos Valley a factory for making a tanning extract from this root is being erected. The yield is from ten to fifteen tons to the acre, and the roots bring the farmers six dollars per ton.

* * *

The World's Steam Power.—These interesting figures are given by the Bureau of Statistics in Berlin. Of the steam engines now working in the world four-fifths have been constructed during the last twenty-five years. France has 79,590 stationary and locomotive boilers, 1,850 boat boilers, and 7,000 locomotives; Germany, 59,000 land boilers, 1,700 ship boilers, and 10,000 locomotives; Austria, 12,000 boilers, and 2,800 locomotives. The working steam engines of the United States represent 7,500,000 horse-power; of England, 7,000,000 horse-power; Germany, 4,500,000 horse-power; France, 3,000,000

horse-power; Austria, 1,500,000 horse-power. This estimate does not include the locomotives, whose number in the world is 105,000, representing a total of 3,000,000 horse-power. The world's steam engines, therefore, aggregate more than 26,000,000 horse-power, equivalent approximately to the work of 1,000,000,000 men.

* * *

Comparative Strength of Materials.—Cast-iron weighs 444 pounds to the cubic foot, and a one-inch square bar will sustain a weight of 16,500 pounds; bronze, weight 525 pounds, tenacity 3,600; wrought iron, weight 480, tenacity 50,000; hard "struck" steel, weight 490, tenacity 78,000; aluminum, weight 168, tenacity 26,000. We are accustomed to think of metals as being stronger than wood, and so they are, generally speaking, if only pieces of the same size be tested. But when equal weights of the two materials are compared, it is then found that several varieties of wood are stronger than ordinary steel. A bar of pine just as heavy as a bar of steel an inch square will hold up 125,000 pounds; the best ash 175,000 pounds, and some hemlock 200,000 pounds. Wood is bulky. It occupies ten or twelve times the space of steel. The best steel castings made for the United States Navy have a tenacity of 65,000 to 75,000 pounds to the square inch. By solidifying such castings under great pressure, a tensile strength of 80,000 to 150,000 pounds may be obtained.

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Electrical Smelting.—The new Taussig electrical smelting process, now being experimented upon in Germany promises to show advance in this industry. Ore is first reduced and smelted, and then the metal is cast. Both processes are carried on in a vacuum, and this insures that the casting is homogeneous, as all bubbles of air or gas are removed. Within fifteen minutes after turning on the current enough heat can be developed to melt pig iron, and it takes but little longer to melt steel. One of the most important advantages claimed for the new process is that it can be operated entirely by water power. This gives it supreme utility in mountainous regions possessing abundant water power but no coal. Even when steam power is used to generate the current it gives a thirty to fifty per cent saving of fuel. From 720 to 800 pounds of coal are sufficient to smelt a ton of iron or steel, where 1,000 to 1,400 pounds are consumed in doing the same work now. When the steel is treated in crucibles the economy is greater. Plants are now being erected in Europe and their workings will be watched with interest by American smelters, especially those located in the south, which has numerous waterways.

* * *

Coloring Scientific Lantern Slides.—At a recent meeting of the Royal Society at Dublin, the President (Sir Howard Grubb) in the chair, Dr. J. Alfred Scott described a method he had devised for coloring lantern slides for scientific or other purposes, apparently referring to photographic slides. The author explained that a gelatine surface should be made wet, and then drained, and when in this damp condition is in a highly suitable state for receiving aniline dyes, laid on in aqueous solutions with a camel's hair pencil, the depth of tint depending on the strength of the solution, and the length of time it remains on the gelatine surface. He found that eosine, tartrazin yellow, vesuvin, and indigo-carmin were the most suitable dyes, especially as they could be mixed, and compound colors formed without chemical decomposition among the "paints." With regard to eosine, however, it should be used stronger than is really required for optical purposes as it is liable to become reduced in intensity if the slide be often used. When inks suitable for using with a writing pen are wished for, Dr. Scott recommends the aniline color solutions, with ten per cent of dextrine, eosine and iodine green being good for the purpose, and for black, "encre-noir" made slightly alkaline with ammonia, and similarly thickened.

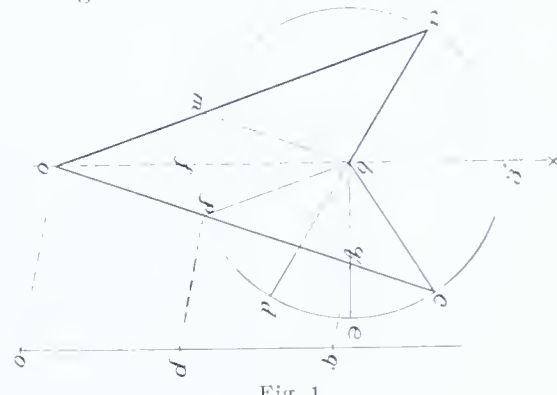
Routes and Rates to Winter Resorts.

The B. & O. R. R. Co., has just issued a little booklet, giving the routes and rates to various winter resorts in Cuba, Florida, North Carolina, Virginia, New Jersey, Pennsylvania and Georgia. The information is very conveniently arranged and indexed. Copies can be had by enclosing a two cent stamp to Chas. O. Scull, Gen'l Pass. Agent, B. & O. R. R., Baltimore, Md.

A. F. Purdy, postmaster at Lawrence, Cal., has invented a recording stamp book that promises to become a popular adjunct of every postoffice and of every extensive merchantile establishment. The book is made of wax paper and stamps pasted therein, glued only on the marginal blanks, do not curl or adhere to each other. The book is made in two sizes, one for use of postmasters and the other for use of merchantile firms and publishers.

To Divide an Angle in Three Equal Parts.

The contribution to the October number of the INVENTIVE AGE by Mr. Emil Christiani, of Washington, D. C., accompanied by a diagram illustrating the trisection of an oblique angle brought forth from Miss Jesse Burgster, of Jamestown, N. D., a criticism and as she claimed, a simpler solution of the problem. The two diagrams are presented herewith, Fig. 1 being by Mr. Christiani and Fig. 2 being by Miss Burgster.



An Architectural and Engineering Triumph.

(Continued from 1st page).

ington Monument, the great white dome of the Capitol, the majestic Library Building, the White

law. It involves the construction of section 4,887 of the Revised Statutes, as to whether an American patent expires with any previously granted foreign patent, or whether it runs for the full term of seventeen years from the date of its issuance. In this

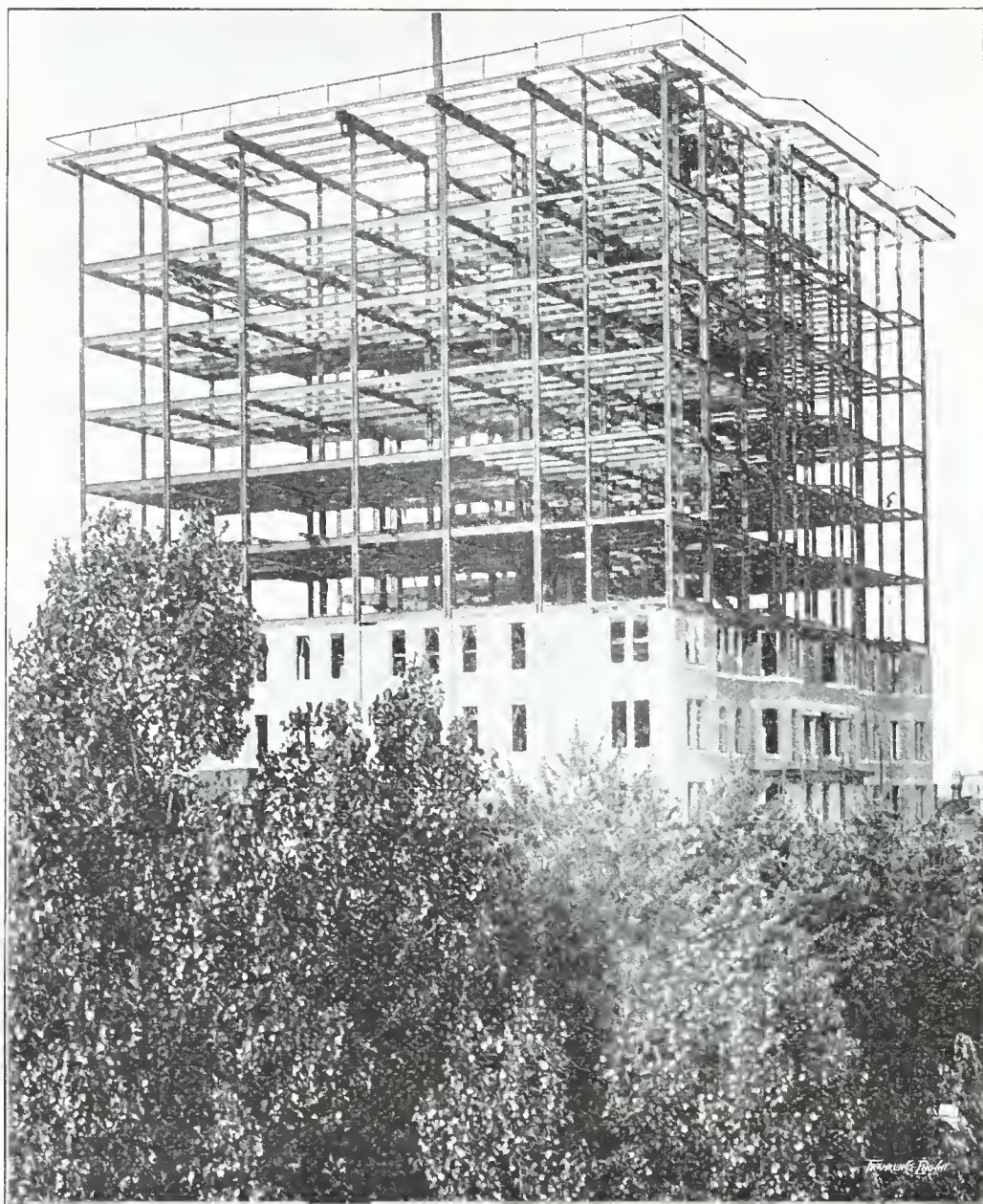
that the Bell patents in this country expired with the foreign patents, will be compelled to retire from the field. On May 3, 1892, three patents were issued upon the invention of Thomas A. Edison, to the Western Union Telegraph Company, and by it transferred to the Bell Telephone Company, under the contract existing between these two companies. The three patents cover what is commonly known as the "microphone transmitter," and are so broad that if the courts extend the life of these patents, it is expected that they will cover every commercial form of telephone.

Present Status of the Panama Canal Enterprise.

The Panama Canal was inaugurated in 1879, and digging actually commenced in 1881. In March, 1889, work ceased owing to lack of funds. Up to the stoppage of work in March, 1889, 48,400,000 cubic meters (17,085,200,000 square feet) of earth and rock had been removed, leaving a balance of 30,000,000 cubic meters to be removed for an eight-lock canal, as proposed. The total length of the proposed canal was forty-six and one-third miles, depth, twenty-five feet, width at bottom, seventy-two feet, and at surface of water 124 feet. The following figures taken from the report presented to the President and Judges of the Court of the Seine, on July 25, 1890, by the liquidator, M. Monchicourt, will show the greatness of the enterprise, etc.: Total expenses at Panama, £31,330,937 (\$156,654,685); total expenses in Paris, £15,628,066; purchase of Panama Railway shares, £3,730,727; payments of the Civil Society of Obligations for the lottery scheme, £1,290,587; payment to the Columbian Government, £98,203; total, £52,078,520 (\$260,392,600). It is estimated that the total loss has been more than \$50,000,000, and that, to complete the work, quite \$30,000,000 more would be required.

American Association of Inventors.

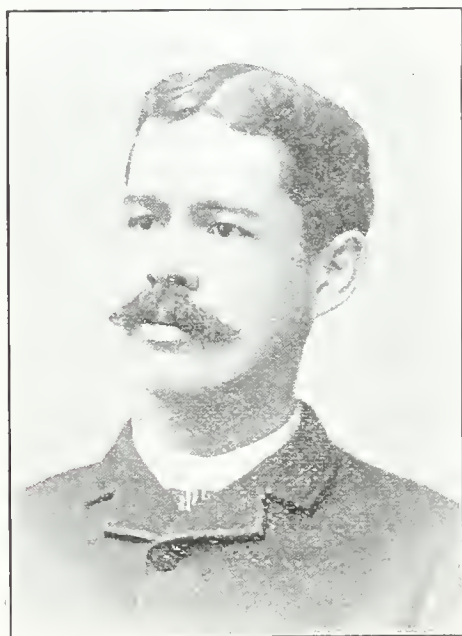
The regular annual meeting of the American Association of Inventors and Manufacturers will be held in this city, January 15th, 1895. Reports will be presented by President R. J. Gatling, and the Committee on Legislation and interesting papers on various topics relating to inventions, etc., will be read and discussed. Among the members who have recently joined the Association are the following well known gentlemen: Judge Robert S. Taylor, of Fort Wayne; Francis Forbes, of New York; Paul Bakewell, of St. Louis; P. L. Salmon, of Syracuse; Joseph D. Gallagher, of Newark; Geo. Draper, of Aopedale, Mass.; Philip T. Dodge and L. G. Hine, of this city; C. K. Longnecker, of Painted Post, N. Y.; Harry H. Blades, of Detroit; G. H. Schulte, of Milwaukee, and Gen. Asa S. Bushnell, of Springfield, Ohio. The coming meeting promises to be the most important of any ever yet held.



VIEW OF "CAIRO" SHOWING THE STEEL FRAME.

House, the famous Lee Mansion at Arlington, across the placid Potomac—that slowly winds its way between the hills of Maryland and Virginia, past the tomb of the "Father of his Country," at Mt. Vernon—are points of which the patriotic American never tires and from the tropical resort on the

decision the Bell telephone people are also greatly interested. If the Supreme Court decides that an



T. F. SCHNEIDER.

roof of the "Cairo" the panorama of picturesque Washington is indeed sublime.

The cost of this building approaches \$600,000. It is one of the largest and most conspicuous thoroughly fireproof building south of New York.

An Important Decision.

The decision of the U. S. Supreme court in the Bate case is being looked for with a great deal of interest. The case is regarded as one of great importance as settling a much vexed question in patent

American patent runs its full term of seventeen years, independent of any foreign patent, other telephone companies, organized upon the assumption



VIEW FROM ROOF GARDEN OF THE "CAIRO."

INVENTORS will find information in THE INVENTIVE AGE, from time to time, worth many times the subscription price, \$1 a year, postage paid.

PERTINENT QUERIES.

Examiners of, and Practitioners Before the U. S. Patent Office.

Should the Patent Office examiners be practical mechanics?

Should practitioners be members of the bar?

These questions are important, for upon them depend largely the right administration of, as well as the proper presentation of the claims of inventors at the United States Patent Office. The educated *practical* mechanic or machine shop examiner, has an advantage over the educated *theoretical* examiner, in that he sees and appreciates, at a glance, on account of his workshop experience, the difference in the operation between one mechanical device and another of the same class. He knows its uses and value, how it is intended to work, whether it will work in practice and is, or not, a step forward in the art to which it belongs. The theoretical examiner is often at a loss to know wherein the utility of a contrivance lies, because he has had no practical experience in the machine shop, factory or mill, either as a lathe user and maker, engine builder and engineer, or in other branches of the practical and scientific school of mechanism. Very often the theoretical examiner cannot readily understand mechanical drawings, and is not familiar with machine, and other shop terms, applied to different parts of machinery, and therefore is not only annoyed with his occupation of Patent Office examiner, but he also annoys the long experienced, competent practitioner by causing him serious trouble after he has with great care prepared the specifications, claims and drawings for the application for a patent. It is believed by the writer, who has had more than a third of a century's experience, that the greatest injury imaginable has been done, and is now being done by the government, to inventors, by failing to put into the examining corps of the Patent Office, when vacancies occur, men who have wisdom, and years of experience from working practically in the machine shop and factory. The practical mechanic of the present age, if he has had a good education embracing scientific mechanics, would, in the writer's opinion, make a far superior examiner of inventions presented for patents, at the Patent Office, than a well educated theoretical mechanic who has not practically worked upon and operated machinery; and, besides the advantage held by the practical mechanic for the reasons stated, he possesses a quality which is important—that of a fellow feeling for the inventor as one of the struggling masses of the world and on the same plane where he has been, and is ready to appreciate the efforts of his fellow craftsman—not being exalted by the idea that he possesses the fund of all knowledges. A practical mechanic of good sound judgment and discrimination, and sufficient education of the right kind will, in most cases, be capable of disposing of twice as many cases in a given period, with greater certainty as to the correctness of his decision, than a merely theoretically educated examiner. We therefore give our preference for appointments in the Patent Office, to wise, discriminating, practical *mechanics*, over theoretical mechanics who, in many instances, imagine they know every thing while, in fact, for a want of practical experience, find out, in time, that they lack a great deal—and only after many years of experience as examiners in the Patent Office are able to rise to the high plane of the practical, educated mechanic.

The question may be asked. How can suitable persons for filling the office of examiner of the Patent Office be secured? The answer to this is, in the writer's opinion as follows: Let the U. S. Government take money from the surplus Patent Office fund of over four million dollars lying idle in the U. S. Treasury, and with it erect a building in Washington and equip it with appliances or plants of every mechanical trade and art, and admit the most meritorious students who graduate from our public high schools as well as from the public high schools of other cities, for the purpose of learning a mechanical trade and the applied sciences, such as their tastes lead them to follow. The writer suggested this several years ago to Prof. Eaton at the time he was at the head of our National Educational Bureau, in answer to a circular of inquiry, which he sent in respect to the important question. What is the best thing to be done for our youth who graduate from the public schools?

With respect to practitioners before the Patent Office, usually styled solicitors, attorneys, patent agents and patent counselors, the experience and practice of the writer have proved that the chief requirement is a scientific and practical mechanical knowledge, with educational advantages such as fit them for writing correctly, and describing the peculiarities of a machine or invention, with a general knowledge of the principles of law governing the grant of patents. It does not seem essential or neces-

sary for a patent solicitor to be a graduate of a law school or an admitted member of the bar, for such persons, by reading the rules of practice of the Patent Office and the patent laws, and studying the decisions of the lower and higher courts, in patent causes, will, if intelligent in an ordinary sense, become, in a few years, thoroughly versed in the questions involved in such matters, and can govern their actions intelligently, in view of such decisions both in the preparation of the specifications and claims for a patent and prosecuting applications before the department.

It is a well established fact that reputable persons known as patent agents, solicitors, counselors and attorneys, are far more capable of preparing an application for a patent, giving opinions as to questions of patentability, infringement and the like arising in patent practice; and also acting as experts, than most of the admitted members of the bar, who do not follow the patent agency or soliciting profession. This being so, it would seem that there is no necessity for making the additional requirement that practitioners, in order to act before the Patent Office, be members of the bar; but while this is so, it should be insisted that all practitioners before the Patent Office shall keep their records clean, and do full justice to their clients if they desire to continue practicing before the Patent Office.

In connection with the foregoing, it is deemed proper to refer to some recent reforms in the Patent Office brought about by the Hon. John S. Seymour, present Commissioner of Patents. When Commissioner Seymour entered upon his duties he felt at once that he had great responsibilities upon his hands, and accordingly acted like a faithful and wise steward. He first aimed to find out those things which tended to retard the speedy passing to issue of applications for patents, when such were of a meritorious nature. One great step in the path of reform that he took, was to prevent the issue of duplicate patents, or such patents as would not stand the judicial test; and to this end he urged Congress to increase the number of the examining corps, and while waiting for his prayer to be granted, he sought to more effectually utilize the services of those now in employ, and also benefit patentees and their attorneys. His master stroke in this direction was an order cutting off the opportunity afforded for raising vexatious, technical objections before passing upon the merits of the claims set up in the application. This order was, that an application for a patent should first be examined on its merits, if possible, and that all minor matters or frivolous objections should be made at the same time, or before the patent was finally passed for issue. This order will result in a saving of about one-third of the time and labor expended upon an ordinary application for a patent. It is believed that applications will now be examined much more rapidly, and thousands of dollars heretofore expended for useless clerical labor will be saved by this order alone: and besides this, counselors of acknowledged reputation will no longer be annoyed, for one or more months, by calls upon them to comply with objections made by officials, and then, after a full compliance with such unjust demands, be more than disgusted with an action on the merits of the claims in these words, "Your application has been examined and all the claims rejected in view of patents, etc." Had this last letter been the first one addressed to the applicant or his attorney, there would have been no necessity for ten or more letters passing between him and the Office, and the annoying, useless labor imposed upon the counsel prior to this action, would have been avoided.

Commissioner Seymour, although a comparatively young man, has shown a ripe and far reaching mind, with great energy and earnestness of purpose—without doubt he possesses qualifications which will enable him to administer this very important branch of the government with honor to himself and benefit to inventors who have been rightly styled "benefactors of their race." A clear headed, firm, earnest, energetic, true and honest man, possessing legal and judicial qualifications is necessary at the head of the Patent Office, and if Commissioner Seymour proves himself to be possessed of all these, he will ere long bring the business of the Patent Office to the high standard that it should always occupy, and a speedy and generous meting out to inventors of their just and legal rights, will follow, viz: The grant to them of patents for their meritorious inventions or improvements, notwithstanding such inventions or improvements may be but short steps in advance of those which have preceded them in the same branches of manufacture, science and art.

One of the most beneficial reforms that could be brought about, in the writer's humble opinion, would be to insist that the primary examiners shall duly regard the decisions of the examiners-in-chief on questions of patentability and the rules of law governing the grant of patents. This tribunal was established by Act of Congress in 1861. Chap. 88, 12. Statute at large 246, to assist the Commissioner of Patents in his arduous duties; to establish uniformity of decision in respect to patentable inventions. The language of the Act is:

For the purpose of securing greater uniformity

of action in the grant and refusal of Letters Patent," there shall be appointed three examiners in chief, to be composed of persons of *competent legal knowledge* and *scientific ability*, whose duty it shall be, on the written petition of the applicant for that purpose being filed, to revise and *determine* upon the *validity* of decisions made by *examiners* when adverse to the grant of letters patent; and also to revise and determine, in like manner, upon the *validity* of the *decisions* of *examiners* in *interference* cases, and when required by the Commissioner on applications for the extension of patents, and to perform such other duties as may be assigned to them by the Commissioner; that, from their decisions, appeals may be taken to the Commissioner of Patents in person upon payment of the fee hereinafter prescribed; that the said examiners-in-chief shall be governed in their actions by the rules prescribed by the Commissioner of Patents.

It will be a bright day for the patent system when the examiners-in-chief are looked up to for judicial direction by the examiners of the Patent Office; the Commissioner of Patents relieved of appeals from them to himself in person, and appeals shall lie directly from the decisions of the examiners-in-chief to the Appellate Court of the District of Columbia.

As appeals to the District Appellate Court are very tedious and beyond doubt are now, under the vaguely worded law, unnecessarily expensive, it certainly would be a good reform, in the writer's opinion, for the whole matter as to the grant of patents—both as to patentability and interference questions, to be left for determination by the examiners-in-chief, the Commissioner of Patents sitting as a member of such body in any very important case that required his presence.

ROBT. W. FENWICK.

One Sided Justice.

According to a recent decision of the U. S. Supreme Court, an inventor or patentee whose invention may be used by the U. S. Government without agreement or contract, has no claim against the government, the court holding that "some element of contractual liability must lie at the foundation of every action," *i. e.*, against the government. The amount at issue in this case was about \$60,000, claimed as compensation for the use by a government architect at the Capitol grounds of a patented pavement. The decision may, and probably will, influence the action of inventors of arms and other patentable devices which must be submitted to government officials, because virtually it seems to give such officials the power to simply adopt and use anything they may see fit without compensation to the inventor, even though he have a patent issued by the government itself giving him the sole right to manufacture or sell within the United States.—*American Machinist*.

THE Carnegie Steel Company proposes to build immense blast furnaces and probably other plants in connection with their Duquesne mill. The construction will involve an expenditure of nearly \$1,000,000. This is accepted by Age of Steel, as a significant indication of how the wind is blowing in business calculations of the future.

PARTICULAR attention is called to the large list of novelties advertised in this issue. Many of these are especially useful and desirable and are offered to readers of THE INVENTIVE AGE at remarkably low prices. The Inventive Age will be sent free for one year to any person purchasing \$5 worth of these novelties.

The accession of Denmark to the International Union for the Protection of Industrial Property is officially announced. This accession, which took place October 1, 1894, includes the Faroe Islands, but neither Iceland, Greenland, nor the Danish West Indies.

THE business of Messrs. Platt Bros., manufacturers of cotton machinery, at Oldham, England, was established over seventy-five years ago. The works occupy fifty-five acres of ground and give employment to over 9,000 men.

NEXT month THE INVENTIVE AGE enters upon its sixth year with a new volume. We are proud of the success it has achieved during the past year and the favor it has gained with inventors and manufacturers throughout the world.

WE can recommend the new Climax \$2 watch, advertised in another column, as a good time-keeper, handsome in appearance, durable and the greatest bargain ever offered in watches.

THE INVENTIVE AGE has made arrangements with Bubier's Popular Electrician, whereby it can furnish both THE INVENTIVE AGE and Electrician one year for \$1.50.

M. CH. V. LINGER has produced miniature cyclones by passing electric discharges through gases. All the phenomena of the cyclone are reproduced on a small scale.

High Speed Electric Swing Cranes.

The illustration presented herewith shows an interior view of the foundry of the Baldwin Locomotive Works, to the equipment of which three of the latest and most improved forms of high speed electric power jib cranes, designed and constructed by Wm. Sellers & Co., Incorporated, Philadelphia, have recently been added. The photograph—an exceedingly fine one—was made by Mr. Charles Truscott and has been well reproduced, directly from the negative by the Levytype Co., Philadelphia.

The picture shows in the fore-ground an electric jib crane of 10 tons capacity, having an effective radius of $21\frac{1}{2}$ feet, two hoisting speeds of 10 and 40 feet respectively per minute, racking speed of carriage 35 feet per minute, and making one complete rotation of the jib per minute, all these movements being actuated by one constant speed electric motor and controlled by one operator standing on a platform near the floor, by means of the hand levers.

This novel swing crane differs as greatly in appearance, construction and operation, from the slow-moving old time wooden crane as the modern high speed trolley car differs from its predecessor.

The frame work is constructed of wrought iron, is both light and strong, and is able to withstand the torsional strains due to rapid rotation of the load, and it will be noticed that in addition to the advantages of high speed, the load can be handled much closer to the axis of rotation than is possible with the older form of construction.

The illustration shows a duplicate crane in the middle ground in course of erection and in the background the frame work of another similar crane resting upon the floor.

The substitution of electric motors for steam or other power for operating both "jib" and "overhead traveling cranes," with radical changes and improvements in the details of construction have practically revolutionized the system of handling heavy materials used in engineering constructions, so that, while the crane is, in principle, one of the oldest of mechanical devices, its modern development amounts practically to a re-creation, entitling it to consideration in this paper as one of the great inventions, taking high rank among the mechanical achievements of modern times.

Tempering Steel.

Prof. F. W. Wild, instructor in the metal department of the house of refuse, Baltimore, has this to say upon this interesting subject in the *Sewing Machine Times*:

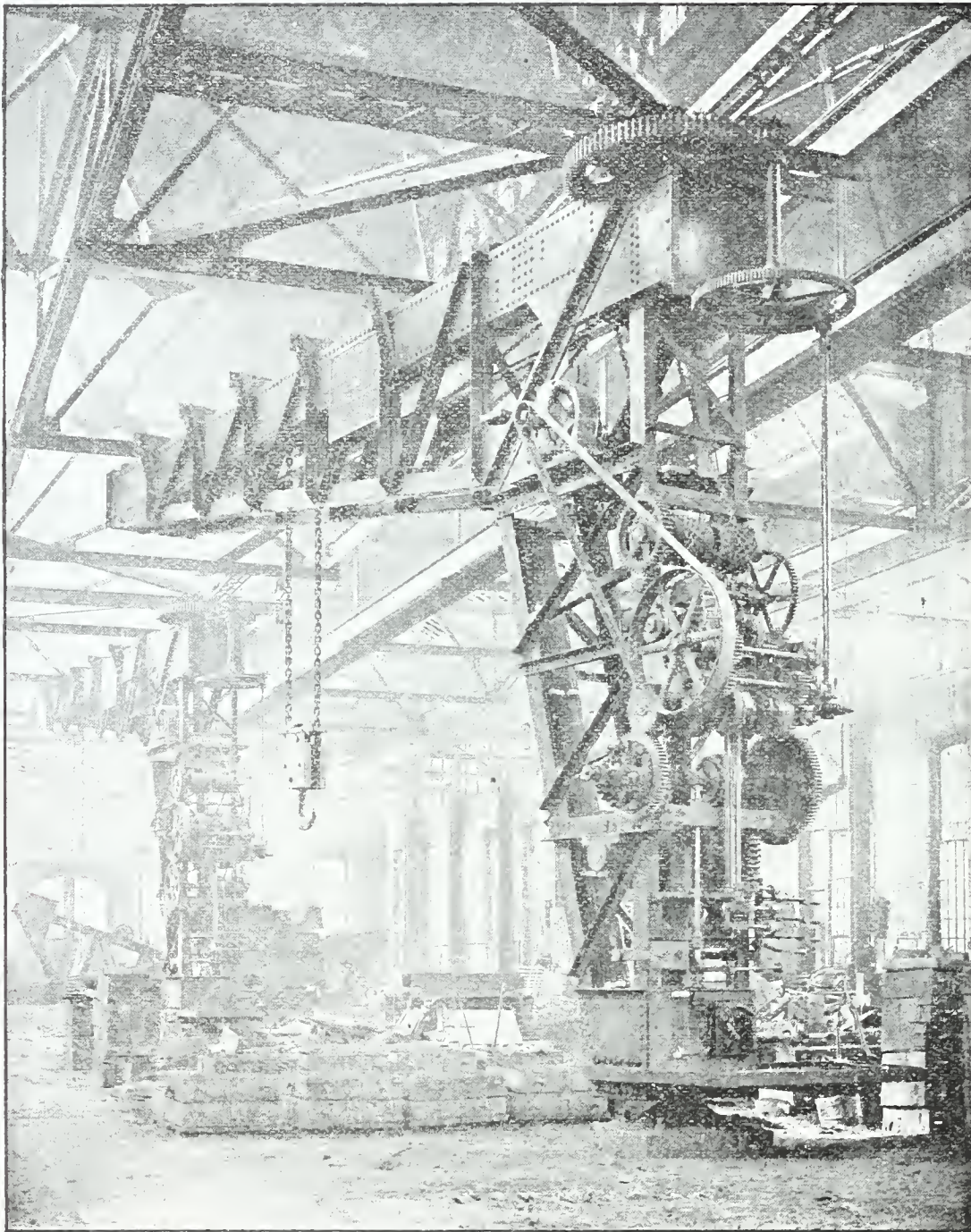
If you heat a piece of bright steel over a clear fire that will not smoke it, you will see several colors arise as its gets hotter and hotter until it finally becomes red. These colors are due to oxidation. This is a word that I will stop to explain:

The air we breathe contains two gases—oxygen and nitrogen, with a small proportion of a third, called carbonic acid. Neither of those *alone* will support life or keep the fire burning or enable vegetables to live or grow, but it is the first—oxygen, which is important in this, that it is the chief support. The second—nitrogen, only serves to dilute the other, rendering it less strong. If we breathed oxygen alone, we should live too fast and wear out our bodies in a few hours. If we breathed nitrogen

only, we should die, and so of carbonic acid gas.

Now, this oxygen seizes on everything in a wonderful and sometimes provoking manner. If you leave a bright tool out of door to get damp, down comes oxygen and rusts it. It combines with the iron and makes oxide of iron, which we call rust. Then, you have noticed, when working at the forge, that scales fall from the hot iron as we hammer it. These are black, but our old friend has been at work and united with the red hot iron and formed another oxide called black oxide. When we begin to heat steel down comes the oxygen and does his work; first pale, then yellow, then it gets hotter and shows a tinge of red with its yellow forming orange, then it begins to get purple, then blue, then deeper blue, and finally black, before it gets absolutely red and white heat.

Now, to temper steel, we first heat it red hot, not minding these colors, then we cool it suddenly in cold water. This renders it very hard indeed; no file will cut it, or drill penetrate it; but if we strike



ELECTRIC SWINGING CRANE IN BALDWIN LOCOMOTIVE WORKS.

it, behold it breaks like glass! This is too hard for a tool for general work, for the edge will clip and break if it meets with any hard spots in the metal or chances to bite in too deep. It is too brittle. For this reason we have to let down or temper the tool, and we proceed as follows: The part to be tempered is brightened on a stone or an emory stick and laid on a bar of red hot iron or heated in a way most suitable or convenient. And now our friend oxygen puts on a pale yellow. This will do for turning steel and iron, but is still too hard for general work. Then comes the orange, and this presently turns slightly to blue, at which point it is instantly cooled in water. Now it will be found to bear a good edge, hard, but sufficiently tough for work.

Most tools are let down between the yellow and the blue for metal work, and the nearer they approach the blue the softer they will be. Thus, by observing the colors, we can easily manage our tools. In hardening and tempering tools that have metal enough to impart sufficient heat to give it the desired temper, the point alone is dipped in cold water until quite cool, then brightened as described above, then let the heat back of the hardened part come down until the edge has the desired temper.

A New Project.

When the mercury drops 20, 30 or 40 degrees in a single day, as it frequently does in our higher latitudes, the result is not only detrimental to the comfort of man, but it involves his health and his life in countless cases. The poorer classes dread the appearance of winter as they would the approach of a plague. It means a period of sharp suffering for them, unless they can afford the increased expenditure for fuel and clothing that it creates, and if they cannot meet this extra drain upon their pitiful resources, it only too often means disease and death.

This being the case, and any measure that will modify the desperate rigor of the winter atmosphere, even in limited localities, would be hailed as one of the greatest boons that could be given to the world.

But is any measure of this kind practicable? I hold that it is. If a city, town or village can be lighted by gas through the medium of mains, why cannot it be heated through similar channels, and why cannot this heat be carried through sub-tubes into every house, just as light and water are carried now?

This is a question that inventors are beginning to discuss, and I believe that its feasibility will be demonstrated before the sunset of this century, and demonstrated to an extent that will enhance the welfare of humanity in a myriad of ways. I hold that the time is close at hand when homes and business places of the people will be made more comfortable by this proposed method. This scheme would prove a blessing to mankind.

It may be objected that the cost of maintaining the furnaces that supplied the heat would be tremendous. It would; but the consequent tax upon the individual would be less than the sum he pays for his fuel under the present old foggy system of warming himself and his family, and he would have the sweet satisfaction of knowing that while he was contributing to his own comfort and convenience, he was sharing the genial warmth with thousands of his fellows who are huddled in the garrets and cellars of our land today, quivering with cold, and yielding to the ravages of disease that it implants.

Much is doing in the forward march of humanity to alleviate the pangs of poverty; but much must still be done. The devil of cold must be driven out of the huts and hovels of the miserable multitudes who have been lost in the shuffle of fortune, and what better plan can be proposed than the one that I present in this monograph.

I trust that professional inventors will take up this subject and discuss it in all its details. They may suggest better systems than the one herein proposed, looking to the same general end, but it is a matter that should be given immediate consideration, earnest

and active investigation in all its bearings, and, by a united effort, I feel confident they can force the reform to the front and crown it with a deathless triumph before the sunburst of the XXth century floods the world with its splendor.

WILL HUBBARD-KERNAN.

Peculiar Locomotives.

The Baldwin Locomotive Works has turned out three locomotives for the Erie & Wyoming Valley Railroad, which have some peculiar features. They are moguls, with 56-inch drivers, wide fire-box (not Wooten), and weigh about 120,000 pounds. The peculiar features are the three 17 by 24 inch cylinders, set on an incline, so as to allow the middle one to drive the main axle just inside the right driver, all being connected at 120° , so as to have a continuous pull, deemed necessary by the master mechanic, Mr. John B. Smith, of Dunmore, Penn., on account of the heavy grades on the road. The tank is also peculiar to American roads, and is the same as that adopted by Daniel Cox, Jr., of the D. S. & S. R. R., being a six-wheel tank similar to English practice. —*Machinery*.

SCIENCE FOR YOUNG PEOPLE.

Conducted by E. P. LEWIS.

The energy or work that we obtain from a galvanic battery is produced in exactly the same way as that which we get by burning coal in a steam engine, though the resulting effect is somewhat different. What we call combustion is the chemical union of oxygen gas with the substance burnt, and you can easily prove that combustion can no more go on without the presence of oxygen, than our lungs can do without it—in fact our own muscular energy is directly and solely due to the slow combustion of the food that we eat by the oxygen of the air that we breathe. If you place a candle under a bell jar, in a few minutes all the oxygen will be burnt up, and the candle will go out.

In a galvanic cell the current is caused by the oxygen in the acidulated water uniting with the negative plate and forming a chemical compound. For instance, in a Daniell cell the zinc becomes oxidized, or burnt very much as we burn coal, with the difference that electrical instead of heat energy is the result. It would be very expensive, however, to do our work by burning zinc, for it costs so much as compared with coal that, notwithstanding the great waste of energy in the steam engine, it is cheaper to get our electricity from dynamos run by the latter.

* * *

In utilizing the energy of coal by using it as a fuel we lose at least 90 per cent. If we could use coal as the negative electrode of a galvanic cell, surrounded by some fluid that would oxidize it, we could use over 90 per cent. You can see, then, what fortune and fame will be the reward of the man who discovers the battery fluid that will do this. Edison and many other inventors are cudgeling their brains over this problem, but so far no one seems to have the clue to the secret which will enable us to get more than ten times as much worth out of a pound of coal as we now do.

* * *

The ethereal waves which transmit light, heat and electricity, are all alike except as to their length. We are accustomed to regard only a few substances, such as glass, as transparent, but as a fact, there are few substances except the metals which are not almost perfectly transparent to certain kinds of these waves. Even metals in thin sheets are partly transparent to short waves. Heat waves just a little longer than the waves of red light, will easily pass through ebonite, which is perfectly opaque to the shorter light waves. Longer waves will pass through thick boards, pitch, sulphur, etc., while the longest electrical waves will pass without difficulty through houses and thick stone walls, though they are reflected from the thinnest sheet of metal.

* * *

A substance may be opaque to these waves in two distinct ways. It may absorb them or it may reflect them. A surface covered with lamp black will entirely absorb light waves, reflecting none and transmitting none. Polished silver will perfectly reflect them. When the molecules of a certain substance are of such a size that they will vibrate in exactly the same time as a light wave, the latter will impart its motion to the molecules and itself cease to exist, we then say that it is absorbed. In just the same way, slips will be set rolling violently by waves of certain length, while others will affect them very slightly.

* * *

It is to the manner in which different colors are absorbed or reflected by a body that its color is due. If white light falls upon a red rose bush, the red alone is reflected from the flower, the other colors being absorbed. The green leaves, on the other hand, absorb the red entirely, and reflect nearly all the green light. A rose in green light or a leaf in red light would appear absolutely black, for in each case the light which the object can reflect is absent.

* * *

Some substances, like red ink made from aniline dyes, appear of different colors, according to whether the light you see them by passes through or is reflected from them. The light reflected from the ink will be green, while that passing through it is red.

* * *

Did you never wonder why meteors shine so brightly? Where do they get their heat and light? If it were not for the earth's atmosphere we should never see these meteors. Out in distant space they are cold—probably much colder than anything on the earth. When they strike the upper limit of the earth's atmosphere, they are going very fast, 40 or 50 miles a second perhaps. The air is very much

rarefied so high above the earth, but still there is enough to heat these meteors white hot by its friction against them. Most of the meteors never reach the earth, as the heat is so intense that the smaller ones are turned to vapor. Those that reach the earth are always partly melted, as you will see in specimens kept in museums.

* * *

Where do these meteors come from? We have every reason to believe that most of them are fragments of comets. Whenever the earth crosses the orbit of a comet, meteoric showers are seen, and it is interesting to know that the meteors that have been found are all composed of materials found on the earth, generally iron. It seems very certain that all the planets and stars are made of the same materials as the earth.

* * *

The observations of meteors give us the best idea of how high the atmosphere extends. If a very bright meteor is observed at the same instant at both Boston and New Orleans for instance, it is easy to calculate from the distance between the two places and the directions in which it was seen, how high above the earth's surface it was, and we know that the atmosphere must extend at least that far in order to make the meteor visible.

A New Electric Locomotive.

There is an electric locomotive in course of construction in Boston, Mass., which promises to meet all the requirements for propelling railroad trains. It is an eight horse-power machine and is unique. The distinctive feature of the invention, says the Boston Transcript, is the substitution of a piston and cylinder in place of the usual rotary power. The cylinder is much longer than for steam purposes, and has in its interior a series of magnets. The piston passes entirely through the cylinder, with cross-heads at either end. On the piston within the cylinder is a series of armatures of peculiar construction.

On the axle of the driving wheels are commutators whose function is to apply and cut off the electric current, just as the eccentrics control the steam of a steam engine. The principle of the machine is the admission of the current to the magnets in the cylinder, which are in advance of the piston rod, and by their action on the armatures the piston rod is moved forward. As the stroke is ended the current is cut off from the magnets first charged and applied to those at the rear of the piston, giving it a reverse motion, thus maintaining a strong, regular motion. There is absolutely no back pressure from the electric current, while in a rotary motor this is estimated at 20 per cent of the force applied.

It is practicable to run the machine at 200 revolutions of the axle per minute, and with a driving wheel 8½ feet in diameter, and the crank pin 3 feet from the center, there would be a 6 foot stroke under a full head of power. The machine is adapted to receive the electric current either by a trolley wire, a third rail in the track or from a storage battery.—*Street Railway News.*

Electricity in Steel Rail Mills.

It is reported that in 1891 a young French electrician, passing through Carnegie's great steel rail plant at Braddock, Pa., casually suggested that electricity could be utilized in operating the widely separated pieces of machinery, at a great saving in cost. A few weeks ago Mr. Carnegie returned from Europe and, visiting the plant for the first time in over two years, witnessed a verification of the Frenchman's prediction. Electricity has made it possible for eight to do the work 300 did in 1891. One of the improvements is called a "soaking pit." Each "soaking pit" takes the place of ten reheating furnaces. The pits will revolutionize the steel rail business. Electric cranes, the first in the world, will lift the blooms out of the "soaking pits." From Braddock Mr. Carnegie went to Homestead, where he learned that he is the owner of the largest bloom mill in the world. When he was told that one year's output if rolled into a shaft 5 feet in diameter would make a column twenty-five miles high, he said: "How wonderful!" He saw a 25-inch beam weighing 100 pounds to the foot cut in two in twelve seconds by a saw which has no teeth, but the circumference of which travels at the rate of six miles per minute.

A Novel Small Firearm.

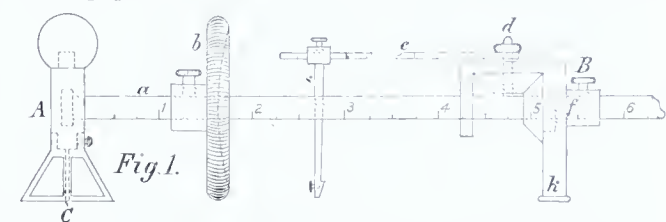
A new weapon, likely to revolutionize army equipments, is now receiving the attention of the naval small-arms board. It is the invention of an American, Hugo Burchard, now in Berlin. It is said to be the only small weapon in which smokeless powder may be successfully used. It is after the style of the Maxim mitrailleuse, being automatic in action, receiving its ability to load and extract empty shells from the recoil of the shot. It is claimed to be the only small weapon capable of doing this continually. In the exhibition 100 rounds were fired without a

hitch. The exhibitor fired twenty-four shots in 43½ seconds at a range of 110 feet and all were hits. It weighs 12 pound 12½ ounces and is 11 inches in length. The grip is placed at the center of gravity, giving a steadier fire. Through it runs a magazine capable of holding eight cartridges with nickel jacketed bullets of 7.65 millimeters, about the same caliber as the navy revolver of the present day. It has great penetration and effective range of about 500 meters. A light adjustable stock may be affixed, making, for all practicable purposes, a carbine for cavalry.

Gear Generating Device.

E. C. Dickinson, of Ames, Iowa, submits the following illustrations and description of an instrument for generating epicycloidal and hypocycloidal curves for gear teeth. The attention of such well recognized authorities as Prof. Robinson, of the Ohio State University, and Oscar J. Beal, of the Brown & Sharpe Manufacturing Company, has been called to the proposed method and engine, and the INVENTIVE AGE would be pleased to hear from Ambrose Swasey, of Cleveland, and Hugo Bilgrim, of Philadelphia, upon the subject. Prof. Robinson and Mr. Beal have pronounced it an ingenious affair with the probability that it could be successfully used in laying out the curves for large wooden gears, but of doubtful utility for small iron gears requiring cutters.

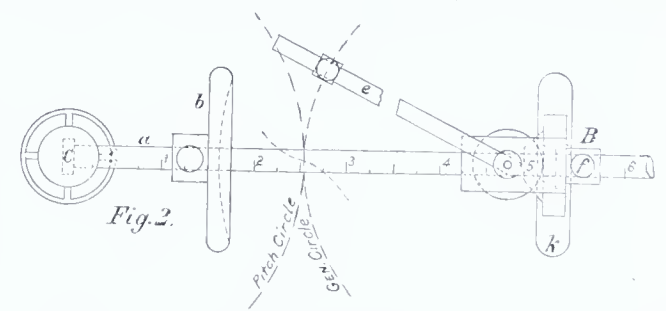
The instrument consists of a vertical standard (A), having a broad base and a needle point (C) in the center. On this standard rests a boxing which receives the headed end of a graduated rod (a) square in section, or round and having a keyway. The boxing permits the rod to turn about its axis, and



also to revolve in a horizontal plane about the axis of the needle (c). On this rod is slipped a wheel (b) which is one inch in radius, and has a milled rim, it can be placed at any distance from the center (c) and fastened by means of a set screw.

Next casting B is slipped on the rod. This piece furnishes bearings for two bevel gears—one on the rod and facing the center, the other facing downward and turning a vertical shaft (d) on which is fastened a graduated arm (e). On this arm is placed a pencil holder (s) which reaches down to the plane of the needle point and the rim of the wheel. The casting also has a broad foot (k) which keeps the instrument in an upright position, and a collar bearing (f) by which the casting can be set at any position on the rod.

For generating epicycloidal curves, place (c) (Fig. 2) in the center of the pitch circle; set the pencil out on the arm (e), a distance equal to the radius



of the describing circle, turn the arm inward until the pencil is under the rod (a) and on the circumference of the pitch circle then set the casting.

Now, for setting the driving wheel (b), we must find a circle about (c) on which (b) will make the same number of revolutions in traveling its circumference as the generating circle would make in traveling the circumference of the pitch circle.

Thus, if the describing circle is 3 inch radius and the pitch circle is 6 inch radius, by proportion 3:6:1::2: or (b) would have to be set 2 inches from the center (c) in order to give the pencil the same motion as if it were a point on the describing circle. Then by holding the center at (c) and drawing the casting in either direction around the pitch circle, the two epicycloidal curves for a tooth may be generated.

For generating hypocycloidal curves it is necessary to turn the casting end for end on the rod so as to give the right motion to the pencil: then turning the pencil outward from the center, and placing it on the pitch circle, the two hypocycloidal curves for a tooth may be generated.

By means of the graduated arm and rod, curves may be generated for any sized generating and any sized pitch circle within the limits of the instrument. For very small gears in which the driving wheel and the casting B will interfere, the wheel may be placed on the opposite side of the center (c) and the gears reversed.

THE BATE CASE.

The Supreme Court Will Decide an Interesting Point in Patent Law.

While under the international patent law the Edison incandescent lamp patent expired on the 17th ult., still there is a possibility of an extension of its life being given by the decision of the U. S. Supreme Court in the celebrated Bate refrigerator case, the announcement of which may be expected soon. The fight is really between the two great companies—General Electric and Westinghouse. It is well understood that the case of Bate Refrigerating Co., vs. Ferdinand Sulzberg, is simply a cover to the real prize at stake—a franchise so valuable as to be worth something over \$1,000,000 for the coming two years if the court decision is favorable. The American patent on the Edison lamp, held by the General Electric company, was brought to an end by the expiration of the Canadian patent—as the law governing the life of patents is now interpreted. By means of this simple Bate suit the General Electric is striving to secure a decision that this view of the law is all wrong. If the court so decides, then a number of small factories which have begun the manufacture of the incandescent lamps must cease operation, but more particularly the Westinghouse Electric company, the great rival of the General, must do likewise.

Ever since the manufacture of electrical appliances has been established there has been more or less litigation between the different establishments over the validity of patents. But most of these suits sink into a second place when compared with the long fight between the General Electric and Westinghouse companies over the incandescent lamp. The incandescent lamp manufactured by the General company was patented by Edison. The Westinghouse company has turned out thousands of lamps claimed to be infringements. Desperation was added to the fight long ago by the knowledge the Edison patent must soon expire under the law as interpreted up to this time by the United States Circuit Court, that is, with the expiration of the shortest foreign patent. This was the Canadian patent, which, as said, expired. The General company does not employ expensive counsel for nothing and the latter quickly formed the plan of securing a decision from the highest court in the land as to what does constitute the life of a patent. It was deemed best not to go into court as the General Electric company, so search was made for a case involving the question it was desired to have adjudicated. In the history of the Bate Refrigerating company patent the necessary elements were found.

In the case of this company patents granted in the United States were supposed to have expired on the date of the legal death of the first foreign patent. Sulzberg, who had made use of the appliance of the refrigerating company soon after the expiration, was sued for infringement. On behalf of the refrigerating company it was contended if the application for a United States patent is filed before any foreign patent issues the foreign patent applied for or issued subsequently, no matter what its term may be, does not limit the life of the American patent.

The decisions of the Circuit Courts of the United States have been to the contrary and to the effect if the American patent goes to issue after a foreign patent has issued so as to be effective in the foreign country, the term of the American patent subsequently granted will expire with the prior foreign patent. But the Supreme Court has never passed on the question. The case was rapidly pushed through the preliminary hearings, guided by James C. Carter and C. E. Mitchell for the Refrigerating company, and Wheeler H. Peckham, Edward Wetmore and L. E. Curtis for the butcher.

Mr. Carter in his argument compared the acts of 1836, of 1839, and of 1870 with Sec. 4,887 of the Revised Statutes and dwelt at length on the intention of Congress in the enactment of these statutes. He contended for a liberal rather than a literal interpretation of the law in the case and argued a system which, between individuals would offer a reward for a service and then abridge it for such reasons as those contended for in the present case, would be dishonest. He contended it was preposterous for the government to impose the penalty of the loss of the three most useful years of an American patent because a foreign government had been more expeditious in granting a patent, when the fault for this delay rested with the American Government itself. To protect his patent abroad the inventor applied for a foreign patent, and in doing so cannot well imagine, if the foreign patent should be issued in advance of his American patent, his rights in his own country will be abridged or any damage would arise to his interests. Previous to 1876, when Mr. Bate applied for his patent, Mr. Carter claimed no hostility had ever been shown by our patent system to the obtaining of patents abroad. On the contrary, that practice, while never disfavored, had been dis-

tinctly encouraged since 1836 by our law, both because it furnished an additional stimulus to invention and prevented disadvantage to American users which come from their being under the burden of a royalty when the foreign users are exempted from it. A whole generation, he said, has become used to the fact that after a man had made a petition for an American patent his rights were safe except through acts of his own.

Agricultural Implement Makers.

The National Association of Agricultural Implement and Vehicle Manufacturers recently convened at Chicago, represented one of the most important industries of the country. In no other land as in this has the inventive genius of man done so much in the devising and perfecting of the implements of agriculture. We have progressed from the primitive flail to the ideal threshing machine, from the scythe to the reaper, and from the slow and stolid colonial plow to the magnificent tickler of the soil that doubles its furrows with the modern plowman riding proudly behind his team. In our rapid annexation of states and territories the plow has made the wilderness a garden, and the bearded wheat and tasseled corn have spread like seas of green, where the sun for centuries shone on solitudes of timber, wild grass and desert. In this swift and unceasing march of development the crude and slower methods of older countries are compatible with the urgency of the situation. More had to be done in less time, and farming districts as large as ancient kingdoms demanded better and quicker working tools. To this necessity native genius has been in response, and in ingenious labor-saving appliances we are confessedly in leadership. In the agricultural implement manufacturer we have the representation of a vital and simply prodigious industry. This industry, with its collateral branches, absorbs the investment of millions of capital, gives employment to more than 500,000 men, and provides the means of subsistence to more than 2,000,000 of the population.—*Age of Steel.*

The News of the Month.

The principal event of the past month was the election on Nov. 6th, which resulted in an overwhelming victory for the Republicans. It was the greatest political landslide in many years and in some respects the most remarkable election in the history of the country. The Democratic majority of 82 in the present House of Representatives was wiped out and the unprecedented Republican majority of 134 will characterize the meeting of the next Congress. The Republicans will have solid delegations from 19 States and majority delegations from 10 other States. The control of the senate will, it is thought, depend upon the senators from Utah, Arizona and New Mexico—a decidedly Republican outlook. The defeat of Tammany in New York and the adoption of all the new state constitutional amendments and the Greater New York proposition are empire state victories in which the whole country rejoices. Another government bond issue of \$50,000,000 was successfully negotiated. The death of the Czar of Russia on Nov. 1st, was the all-absorbing European event outside of the Japan-China war. The new Czar, Nicholas II, entered upon his responsibilities without friction and on the 26th was married to Princess Alix. Several important Japanese victories were reported, the most important being the capture of Port Arthur. It is now believed that terms of peace will be proposed by China and accepted by the victorious Japs.

Those Rascally Patent Agents.

The INVENTIVE AGE, of Washington, D. C., being at "the seat of war," and thrice armed like one whose cause is just, is waging a relentless conflict with the swindling patent agencies and in behalf of the honest inventor and owners of patents. The rascally patent agent and broker like his brother the swindling pension agent and broker, is a festering nuisance, and should be driven out of the capital of the nation. To that purpose the INVENTIVE AGE is committed, and should succeed.—*Stone.*

An electric submarine detector has lately been successfully tried in finding a Russian man-of-war sunk in the Gulf of Finland. The vessel was found in 30 fathoms of water. The principle is that of Hughes induction balance. A telephone in the searching vessels was connected with a searching electric appliance that trailed on the bottom of the water. As soon as it came near the mass of metal the indicator made a loud noise. Divers were then sent down at the spot indicated and found her.

THE *Inventive Age*, of Washington, is at present making a special feature of the exposure of the fraudulent methods of certain patent agents and patent brokers. It is a useful work and ought to do good, but after all is it not possible to boil the matter all down into the simple, common sense business rule never to pay money to strangers without having in hand a return for it, or making a rigid and thorough examination of standing, reliability, etc?—*American Machinist.*

CONSUL-GENERAL PRATT writes from Singapore, that he recently witnessed a new and economical process for the extraction of the fiber of the ramie plant, by simple chemical means and heat. After remaining in the solution about forty minutes a mass of fiber was produced entirely free from gum or other deleterious ingredients. A sample has been submitted to the Agricultural Department of the United States for investigation.

Books and Magazines.

The third edition of Dr. Norman Kerr's celebrated work, "Inebriety or Narcomania: its Etiology, Pathology, Treatment and Jurisprudence," will be published on the 26th inst., by J. Selwin Tait & Sons, under the special authorization of Dr. Kerr. The new edition contains 317 additional pages, and discusses alcoholism and all kindred forms of intoxication, whether morphinomania, cannabinomania, ethoromania, chloroformomania, opiumism, the hashisch habit, etc., and their treatment.

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The show of distinguished beauty, transfixed by famous artists, which is now taking place at the Academy of Fine Arts in New York, has been anticipated by The Cosmopolitan Magazine in its November issue, in an article by Wm. A. Coffin, with illustrations of some of the more beautiful faces. The "Great Passions of History" series has for this month's subject the romantic career of Agnes Sorel, who influenced the destinies of France under Charles VII. "The Art Schools of America," "The Great British Northwest Territory," "The Chiefs of the American Press," and the "Public Library Movement," are amongst The Cosmopolitan's table of contents.

* * *

J. Selwin Tait & Sons publish a novel by a new author, Iona Oakley Gorham. The title of the book is, "Naval Cadet Gorham's Glove."

* * *

Mr. Nelson W. Perry, E. M., has begun a noteworthy series of articles which will appear from week to week in *Electricity*, New York. The first two numbers are already issued, and include "The Water-pail Forge and Its Modifications" and "Speaking Along a Ray of Light." It is announced that this series will constitute a prominent feature of the paper for many weeks to come, and include many of the wonderful applications of electricity in the arts not commonly understood by the people.

* * *

A fresh addition to the "Pseudonym Series" of J. Selwin Tait & Sons is announced in the form of a new work of fiction by John Strange Winter, entitled the "Stranger Woman."

* * *

"Industrial Agreements and Conciliation" are the topics treated by the Hon. C. C. Kingston, Premier of South Australia, in the December Review of Reviews. This magazine is publishing a series of articles by leading Australian statesmen on questions of immediate interest to American readers.

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Persons interested in the progress of flying machines will find the new department in *Forney's American Engineer and Railroad Journal*, on aeronautics, an interesting feature of this magazine.

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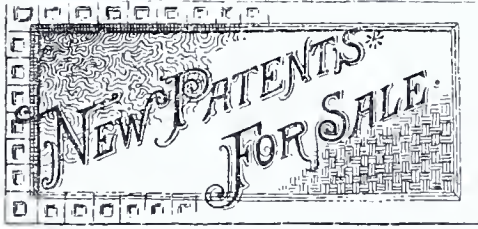
One of the most interesting magazines that comes to our Review Table is the *Indian Textile Journal*, published at Bombay, India. It is handsomely printed and well edited. Its advertising columns, as well as its reading pages, attest the wonderful development of textile manufacturers in that distant country.

* * *

The superb typographical appearance of Campbell's *Illustrated Monthly*, Chicago, and the excellence of its illustrations, entitles this magazine to the highest consideration. The publishers announce that until January 1st subscriptions will be received at half price, \$1.50. It is certainly one of the handsomest illustrated magazines published.

THOMAS J. CLEAVER of Chesapeake City, Md., is the inventor of a steam separator that has been tested and pronounced very efficient and practical. It is especially valuable where non-condensing engines are used. For cleanliness in preventing water from going out of the exhaust pipe, mixing with smoke and cinders and falling upon the decks of steamers, the invention is also a perfect success.

As an illustration of the effect of marine and vegetable growths that attach themselves to the hulls of naval vessels, especially in tropical waters, the commander of "Bennington" reports that that vessel, with a clean hull, steamed from Acapulco to La Libertad, 675 miles, at the rate of 7.85 knots an hour on a coal consumption of 67 tons. Two months later she ran back, 688 miles, at only 6.2 knots per hour, and consumed 129 tons of coal, the excess being due entirely to the fact that she had to drag through the water a vast accumulation of marine growths which there was no means of clearing off without docking the ship. A fortune awaits the inventor or discoverer of some means to protect the bottom of ships from marine growths.



Advertisements inserted in this column for 20 cents a line (about 7 words) each insertion. Every new subscriber sending \$1.00 to THE INVENTIVE AGE will be entitled to the AGE one year and to five lines three times FREE. Additional lines or insertions at regular rates.

FOR SALE.—State Rights to Patent Steam Flue-Cleaner. Costs 25 cents to manufacture; hundreds sold in Ohio at \$10.00 each. Copies of recommendations furnished prospective purchasers. Address, T. W. McDougal, 50 Hamilton Ave., Chicago, Ill.

FOR SALE.—Patent No. 521,053, June 5th, '94. A Fish and Game Trap, state rights for sale cheap, the best all purpose trapeze-invented. Address, Wm. Seaton, inventor and patentee, Greenfield, Painsett Co., Ark. 12-2

FOR SALE.—A valuable patent, No. 520,532. A device for connecting hay rakes and loader with wagons. Will sell the entire patent or State rights. Address, Marcellus Mann, Clearfield, Iowa. 12-2

FOR SALE.—Patent No. 518,934 issued May 1, 1894. "Vent Attachment" for pump pipes. Can be placed upon thousands of driven wells in this country. Prevents pipes from freezing. A sure thing; no experiment. Retail at 50c—500 per cent profit. Now is the time. All rights for sale. Address, L. Adams, Atlanta, N. Y. 12-2

FOR SALE.—Entire right in patent No. 527,957, Duplex Injector Burner. This invention is worthy of the attention of capitalists. Investigate it. Address, T. P. Evans, National Military Home, Ohio. 12-2

FOR SALE.—W. W. King of Lewistown Mo., has a few States yet to dispose of either by State or on royalty of his highly successful Flood Fence, mostly eastern States. Here is a good opportunity for some one. 12-2

FOR SALE.—Patent Weight Door Lock without a spring; the only successful weight lock on earth. Address, David F. Reinhard, Mt. Carmel, Ill. 12-2

FOR SALE.—Outright or State rights, patent No. 520,774, dated June 5, '94. Callers' Register; an invention of merit, practical and very useful; or would correspond with competent salesmen to sell State rights. Address, Lawlor & Co, Joliet, Ill. 12-2

FOR SALE.—Or trade, Patent No. 524,065, issued August 7, 1894, on Journal Bearing, being a simple mechanism comprising an upper and lower member, the latter being provided with recesses for retaining balls, yieldingly supported therein for the shaft to rest upon. Undoubtedly the best journal bearing ever devised. A good opportunity for some one; sale or trade. Address, Daniel I. Lybe, Sidney, Ia. 11

FOR SALE.—Patent No. 489,554; A Milk Can which under air pressure prevents the milk from churning while in transit. Milk dealers should have this milk can. Address, James Cantwell, P. O. Box No. 409 Washington, D. C. 10-12

FOR SALE.—Patent No. 483,899; Improved Rice Huller; delivers the grain in separate bins according to size of grain, etc.; has many other improvements in hulling rice. Address, James Cantwell, P. O. Box No. 409, Washington, D. C. 10-12

FOR SALE.—Cheap if patent is sold at once, patent No. 524,206. The greatest thing on the market; oil or liquid measure and filler; does away with measures and funnels. A fortune in it; unlimited sales. W. Keepers, Philadelphia, Pa.

FOR SALE.—My patent, No. 523,388, anchor for check-row planter. Address, J. Valentine, Aplington, Iowa.

FOR SALE.—Street Car Motor; Patent No. 524,961, issued August 21, 1894. Correspondence solicited. Address, W. H. H. Stineman, Hicks Mill, Md., or Edward I. Clark, 110 St. Paul street, Baltimore, Md.

FOR SALE.—Patent No. 454,254, on toy belonging to the "puzzle" family. A fine opportunity for some person or novelty manufacturer. Only \$170 and royalty if taken at once. Max Cohn, 828 Vliet St., Milwaukee, Wis.

FOR SALE.—Cheap; the patent on Fence Building Tool—all east of the Mississippi river. It is a combination post hole digger; the handiest tool out. Write for particulars to J. W. Brennanman, Abilene, Kansas. 11-1f

FOR SALE.—Two recent valuable patents for Illuminated Revolving Day and Night Store Window Advertising Lantern; practical for introducing and pushing any kind of business, especially in the way of novelties. Owing to pressure of other business patentee will dispose of both patents at a very small price. Address, the sole owner and patentee, Louis S. Sioux Falls, South Dakota.

\$100 cash will buy Patent No. 497,901—Expansible Form for Paper Box Making. Address, Wm. Watt, 43 Purchase St., Boston, Mass.

BUSINESS SPECIALS.

Advertisements under this heading 20 cents a line each insertion—seven words to the line. Parties desiring to purchase valuable patents or wanting to manufacture patented articles will find this a valuable advertising medium.

WANTED.—A patent on a Game Apparatus; will give half interest for some one to furnish the money to get patent, etc. If you want an interest in a good thing, write to J. W. Wright, Buffalo Gap, Taylor Co., Texas.

WANTED.—A partner with \$250 to invest in a new patent Excelsior Machine. There's merit in it. Address James Worth, Union City, Ind.

TO EXCHANGE. Property and money for small inexpensive and easily manufactured patent, mailable article preferred. Address, Ira Lutes, Cairo, Ill. 12-2

WANTED.—To buy a patent, or will take the agency, must be small, practical and useful, give full particulars or no notice taken. Address, "Cash," Inventive Age. 12-2

WANTED.—Will pay for patenting meritorious inventions of small articles in the U. S., provided, a preliminary examination has been made. If that has not been done \$5 must accompany the application. Address, M. L. Schoch, 2810 N. Broad St., Phila., Pa. 12-2

WANTED.—Manufacturers and dealers to know that I want to sell, on commission, their small, useful Patented Novelties that will pay good profits. All reliable firms should write me. I want exclusive right. Can give reference. Address, W. H. Dillon, Virginia, Illinois.

Electric Flashes.

The next annual meeting of the National Electric Light Association will be held at Cleveland, O., February 19-21, 1895.

The electric street railway and the electric lighting system of Vancouver, B. C., have been sold to an English company for \$350,000.

The Ohio Supreme Court has affirmed the constitutionality of the law requiring electric cars to be provided with substantial vestibules to protect the motormen from the weather in winter.

Prof. Alex. Graham Bell is said to be at work on the conservation of energy. It is a purely scientific question. He spends the most of his spare time on it, but thus far has not accomplished anything definite.

It is announced that a large portion of the works of the Thomson-Houston Electric Company which was taken from the Lynn shops and transferred to Schenectady some months ago will be returned to Lynn.

A glance at the early history of the electric motor brings out the striking fact that this machine was invented eight years before the dynamo, and for several decades it was considered of more importance, both scientifically and practically.

Electric welding has been used to remedy blowholes in defective castings by first drilling out the defects and then heating the casting and introducing scraps of steel, which are melted by electricity, making a perfect joint without a seam or flaw of any kind.

The Great Kanawha Falls Water Power, Electrical Manufacturing & Land Co., has been formed at Charleston, W. Va., with a capital of \$2,000,000, to build an electrical plant at the Great Kanawha Falls which are to be utilized and their power transmitted to mines, factories and railroads within a radius of 20 or 30 miles. It is proposed also to furnish towns with street and commercial lighting, and to place trolley wires over the channel of the river for the use of tow-boats, conveying coal from the mines. The principal stockholders are Charles M. Reed, of Baltimore, Md.; A. McCintock, of Philadelphia, and A. O. Patton, W. W. Tompkins, W. F. Scott, T. F. Snyder, and M. Levi, of Charleston.

Want a Fountain Pen?

One of the very best in the market, a standard article, warranted, will be sent as a premium with THE INVENTIVE AGE. The retail price of the pen is \$2.75. We will send the AGE one year and the pen for \$2.75.

Important to Commercial Travelers.

On and after December 1st, Baggage Agents of the B. & O. R. R. Co., will accept coupons from mileage books issued by B. & O. R. R., P. & W. R'y. B. & O. S. W. R'y and Valley R'y of Ohio, in payment for excess baggage charges, at their face value, 2 cents each. This arrangement will not include B. & O. Mileage Books endorsed "good only on B. & O." B. & O. Southwestern Mileage Advertising Books, nor books older than one year from date of issue. 12-1

THE Crown Fountain Pen, a standard article received the highest awards at the World's Fair. It is always ready, clean, simple and economical. Can carry in vest pocket like a lead pencil. Best hard rubber holder, gold top feed and 14k gold pen. Retail price \$2.75. We will send the THE INVENTIVE AGE one year free, in lieu of other premiums to each purchaser of one of these pens.

THE INVENTIVE AGE can recommend the "Climax" watch, advertised in another column, as being, undoubtedly, the best stem-winder watch for the price in the market. It is a good time keeper, and either a plain or imitation engraved cases can be had. This watch is fully timed and regulated and fully guaranteed for one year, the same as Waltham or Elgin.

WE have received from Baker & Co., gold, silver and platinum refiners, assayers and smelters, Newark, N. J., a copy of a little booklet, giving valuable data concerning platinum, illustrating the various uses to which the metal has been put. This firm refines or purchases anything containing gold, silver or platinum.

Aftermath.

The Scotch coal miners' strike is at an end, and the collieries are again in full operation.

The new United States torpedo boat Ericsson is indeed an unlucky craft. Every attempt to carry out a speed trial has resulted in some accident and consequent failure.

An act incorporating the Nicaragua Canal Company, successor to the old Construction Company which suspended last year, has passed the Vermont Legislature.

Southern cotton growers propose to solve the low price problem by growing half a crop next season. The government crop report shows the average yield of corn only 19.7 bushels, the lowest in 13 years.

It is said that in order to meet the competition of tin plate of home manufacture in the United States market, the Welsh tin plate manufacturers are about to demand a reduction of 25 per cent in the wages of their workmen.

The National Tin Plate Company of Anderson, Ind., who are erecting a new plant, drilled in a monster gas well on the 22d ult. It has a flow of 8,000,000 cubic feet per day, and is one of the best wells ever drilled in Indiana.

An agent for a syndicate for Chicago firms secured two large contracts in Japan. One goes to Armour & Co., and is for canned beef to be supplied the Japanese army. The other is a \$370,000 contract for cast-iron pipe, to be used in extending the Tokio water works. The pipe will be made in Alabama. The American firm met the competition of English, French and Belgian bidders.

Cincinnati manufacturers have taken the initiative looking to the organization of a National Manufacturers' Association. The purposes of such an organization would seem to be completely covered by the American Association of Inventors and Manufacturers, of which Dr. Gatling is president and Mr. Geo. C. Maynard of Washington is secretary. The object of this association is to encourage more and wholesome legislation for the protection of inventors and the encouragement and promotion of manufacturing enterprises. The fourth annual meeting of this organization occurs in Washington, January 15th.

EVERY old subscriber who sends us one new subscriber for one year will receive credit for three months on his own subscription.

THE attention of our readers is called to the announcement to photographers and others on page 230.

WILL HUBBARD KERNAN is now editor of the Penny Weekly Story Paper, a Philadelphia publication that promises to become a great success. Mr. Kernan appreciates the INVENTIVE AGE, else the following has no meaning: "The inventors of the United States should be a unit in subscribing for the INVENTIVE AGE, of Washington, D. C., a decidedly handsome and helpful publication, by Marshall Jewell, and one that is swiftly and steadily winning its way in public favor."

READ extraordinary premium offers in this issue—good to old subscribers renewing for another year as well as to new subscribers.

An Extraordinary Offer.

THE INVENTIVE AGE has made arrangements whereby it can furnish the complete set of World's Fair views—220 in all—at a nominal figure. These views are not cheap wood cuts but fine half-tone cuts covering every important feature of the greatest of the world's expositions. THE INVENTIVE AGE one year, and this set of views will be sent to any address, postage for 1.3.

Still another great offer is that of the People's Atlas of the world—maps and statistics corrected up to 1884—124 pages—maps of every state and every nation—a complete Atlas, with over 300 illustrations, usual price \$3 to \$5. We will furnish THE INVENTIVE AGE one year and send the Atlas to any address, postage paid for 1.35. Reliable agents wanted in every county in the United States. Send for terms to THE INVENTIVE AGE, Washington, D. C.

Detectives Needed Here.

Superintendent Chas. Ainge, of the National Detective Bureau, Indianapolis, Ind., announces that two or three capable and trustworthy men are needed in this section to act as private detectives under his instructions. Experience in the work is not necessary to success. He edits a large criminal paper and will send it with full particulars, which will explain how you may enter the profession by addressing him at Indianapolis, Ind.

EVERY reader of the AGE should purchase some novelty advertised in this issue. No better holiday present could be made a friend, and parents will find in this list many valuable articles for the young people.

THE INVENTIVE AGE wants an agent in every city in the United States and will pay liberally for services of thoroughly reliable persons.

THE Salem Iron Works, Salem, N. C., desire to correspond with manufacturers or any party about to engage in manufacturing, of any legitimate nature, that may desire a change of location, or the establishing of a branch industry, with the view of inducing them to visit the Piedmont section of North Carolina before they locate, in order that they may see the many natural advantages of this section.



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Read the following offers to new subscribers:

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THE INVENTIVE AGE one year and two copies of any patent desired, or one copy of any two patents..... \$1.00
THE INVENTIVE AGE one year and a list of 50 firms who manufacture and sell patented articles..... 1.00
THE INVENTIVE AGE one year and Altograph map of the City of Washington..... 1.00
THE INVENTIVE AGE one year and a five line (35 words), advertisement in our "Patents For Sale," or "Want" column, three times..... 1.00

For \$1.

THE INVENTIVE AGE and any one of the following Scientific books:

How to Make Electric Batteries at Home, fully illustrated, by Edward Trevert.

Everybody's Handbook of Electricity, illustrated, by Trevert.

How to Make a Dynamo, by Trevert. Practical Directions for Electric Bell Fitting and Electric Gas Lighting, by Trevert.

Elmer Thompson's What is Electricity?

OUR \$1.35 OFFER.

THE INVENTIVE AGE one year and Joseph Allen Minthorn's famous book "The Inventor's Friend," indorsed by such high authorities, as Dr. Gatling, Clem Studebaker and others..... \$1.35
Book alone 50 cents.

THE INVENTIVE AGE one year and any one of the popular and instructive books as per offer in another column, under heading of "Popular Scientific Books,"..... \$1.35

THE INVENTIVE AGE one year and any one of the "Excelsior Edition of Standard Poets," mentioned elsewhere in this magazine..... \$1.35

THE INVENTIVE AGE one year and a copy of "Picturesque Washington," 200 pp., 136 illustrations, Stilson Hutchins' famous book, former price \$2, sent to any address in the United States..... \$1.35

THE INVENTIVE AGE one year and The Peoples' Atlas of the World, one of greatest bargains ever heard of; size of Atlas 14 x 22 open; latest maps and statistics; handsomely illustrated, a \$2 book with AGE one year—both for..... \$1.35
See another column for other offers.

OUR \$1.50 OFFER.

THE INVENTIVE AGE one year and Robt. Grimshaw's famous book "Tips to Inventors"..... \$1.50
Address all communications to THE INVENTIVE AGE, Washington, D. C.

"HEAT Insulation and Fire Protection in Prominent Buildings," is the modest title of a little brochure issued by the H. W. Johns Manufacturing Co., of New York. This firm makes a specialty of asbestos pipe and boiler coverings, and the little booklet contains views of a large number of the handsomest buildings in the country in which the Johns Company coverings are used. The illustrations are remarkably fine specimens of tone work.

Newspaper Reporters Wanted.

We are informed that the Modern Press Association wants one or two newspaper correspondents in this city. The work is light and can be performed by either lady or gentleman. Previous experience is not necessary, and some of our young men and women and even old men would do well to secure such a position, as we understand it takes only about one-fourth of your time. For further particulars address Modern Press Association, Chicago, Ill.

"BUBIER'S POPULAR ELECTRICIAN" is the name of a monthly publication which contains a vast amount of valuable information on all electrical subjects. Its department of "Questions and answers" will be appreciated by students and amateurs desiring information or instruction on any problem that may arise. THE INVENTIVE AGE has made special arrangement whereby we can supply that popular dollar journal and THE INVENTIVE AGE—both publications one year—for \$1.50.

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE, which keeps inventors posted in the art in which they are mostly interested. — The full address of any patentee, and number of patent found below sent to any address on receipt of one 2-cent stamp. — We will send, postpaid, to any address, printed copies of any U. S. patents, with specifications and drawings, upon receipt of 20 cents for one copy; 35 cents for two copies; 50 cents for three copies. — (See premium offer elsewhere in this issue.) — Address THE INVENTIVE AGE, 8TH AND H STS., WASHINGTON, D. C

LIST OF PATENTS

GRANTED FOR INVENTIONS,
OCTOBER 30, 1894.

- Advertising device, automatic. B H May and J H Morrisey.
Advertising sign device. W C Morrison.
Alkaline salts, process of and apparatus for electrolytic decomposition of. H Y Castner.
Alloy, aluminium. R I Roman.
Aluminium, improving surfaces of. A V Davis.
Aluminium, reducing. F A Gooch and L Walde.
Armature for dynamo electric machine and making same. T H Hicks.
Axle, vehicle. J Miller.
Ballot box, registering and canceling. E K Tolman.
Basket, lunch. A Probola.
Bed and table combined, folding. L Kabell.
Bedclothes holder. G H Hollidge.
Bed, folding. E M Knoblauch.
Beer, manufacturing. P Kropi.
Bell ringing mechanism. W G Alexander.
Belt tightener. M Waddell.
Beverage cooler. J Busch.
Beverages from ice, making. C Fong.
Bicycle. J Carr.
Bicycle. L Ferguson.
Bicycles, etc., drive gear mechanism for. S Kaltonik.
Boiler. R Wildman.
Boiler cleaner, automatic. J H Barr.
Boiler furnace, steam. E R R Hoyt.
Bolting reel. E R Draver.
Book, flat opening. W A Palmer.
Book holder for desks. G W Paisley.
Boot jack attachment. W H Cole.
Boot or shoe polishing device. E Stanwood.
Boring machine. H C Schulz.
Bottle cap, cork holding. W H Northall.
Bottle capping machine. G W Lebolt.
Bottle stopper or cap. F W Fletcher.
Brade and bit. J W Banner.
Brake beam and reinforcing clamp therefor. H B Robischung.
Brush holder. M Wood.
Bucket fastener. H L R Wolf.
Burglar alarm, door locking. H J Mitchell.
Button. J Skilling.
Cable grip. G C Ormerod and J H Charles.
Cable gripper. J Whitall.
Camera. J E Blackmore.
Can body crimping machine. H Schaake.
Can body forming machine. J K Underdown.
Can head flanges, machine for crimping. H Schaake.
Can holder. W V McKenzie.
Can opener. C F Keller.
Can opener and vegetable parer, combined. G H Mitchell.
Can top cleaning machine. C A Burt.
Car brake. P McMullen.
Car brake ratchet handle. J Seeberger.
Car brake shoe and dresser. J E Warwick.
Car coupling. J Bird.
Car coupling. W H Edwards.
Car coupling. O G Ogden.
Car coupling. S Selden.
Car curtain fixture. W H Bean.
Car, dump. G A Roberts.
Car, elevated railway. A L Widdis.
Car fender. W G Kerr.
Car heating system. E H Gold.
Car mover. A Knebler.
Car platform. J Krehbiel.
Car protector, automatic railway. C Klettner.
Car safety device, electric. J M Kelly.
Car, ventilator. H H Love.
Car wheel. C Roberts.
Carburetor. O Moncur.
Card setting machine. C W Arnold.
Carriage spring. C A Behlen.
Cart, self loading. G F Fischer.
Carving machine. R Morgeneier.
Caster. J J Schlichter and J F Fink.
Caster, ball. L B White.
Chimney. E V Wingard.
Chlorin and caustic soda, electrolytic apparatus for the manufacture of. T Drake.
Churn dasher. C S Rogers.
Cigar bunch machine. H Jerstern.
Cigarette paper, machine for applying paraffin to. A C Marchal.
Cloth cutting machine. J Bloch.
Cloth cutting machine. J Wolf, Jr.
Cloth notching machine. J Wolf, Jr.
Clothes drier. C E Cochrane.
Clothes rack. T M Anderson.
Coal or ore separating apparatus. F Pardee.
Coal screen. G W Cross.
Coffee mill. C D Anderson.
Coffee or tea pot. W O Byrd.
Combination case. A J Estlow.
Combination case for cards, etc. A J Estlow.
Collar fastener, horse. M T Burke.
Collar, horse. W T Fell.
Collar, horse. E C Phillips.
Collars or cuffs on shirts, device for holding. A Feiner and T G Saxton.
Concentrator. J Norborn.
Conduit sections, apparatus for manufacturing. J F Cummings.
Conduit, underground. J F Cummings.
Conveying material. F E Duckham.
Cotton chopper. J J Green.
Cotton elevator and distributor. W E Moffitt and J L Williams.
Cotton opening machines, feeding mechanism for. J C Potter.
Counterbalancing momentum of reciprocating elements, means for. M N Forney.
Crane, travelling. W M Brooke.
Crystallization of saccharine or other solutions. L Wulff.
Culinary vessel. A W Obermann.
Cultivator, hand. E Franklin.
Cultivator, wheel. E Children.
Cut out, automatic electro magnetic. L T Stanley and A E Braddell.
Dental mirror. E B Hitchcock.
Dice box. E Gregory.
Digester 2. H W Stebbins.
Direct acting engine. J Kidd.
Disinfecting apparatus. H K Anderson.
Door attachment. N W Cowdrey.
Door check and closer. E I Blount.
Door, flexible. E Brown.
Door hanger. W P Johnston.
Door stop. C O Case.
Dredging apparatus. F A Hyatt.
Dredging implement. C Meier.
Drying articles. H D Williamson.
Drilling machine. T Gilpin and L McHargne.
Drilling machine. W P Norton.
Ear ring. G T Woglom.
Egg carrier. F E, C L, and J H Ten Eyck.
Electric conductors, coating. A F Montgomery.
Electric motor reversing mechanism. J Mellen and N O Goldsmith.
Electric transformer. E Thomson.
Electro magnetic switch. J G Hartel.
Enamel from metal, removing. G W Goetz.
Engine indicator, steam. W M Henderson.
Engine pilot. J Drake.
Engine reversing gear. C E R Martin.
Extension table, center revolving folding. H Graham.
Faucet, oil can. B F Warren.
Feed water purifier 2. S L Bailey.
Fence and gate, iron. I K Hollinger.
Fence building machine. C Neate.
File, invoice or other. M Buchsbaum.
Fire alarm. T R Blackworth and W C McLellan.
Fire escape. C Bartholomew.
Fire extinguishing substances with water, apparatus for automatically mixing. F Muller.
Fishing net. G Tronve.
Flash light compound. A Hensley.
Foundations or underground structures, tube for. R L Harris.
Fountain and sprinkler, combined. J R Cadwell.
Frog, spring. N O Goldsmith.
Fruit huller. J A Murray.
Fruit jar. J H Williams.
Furnace. E and A W Bennis.
Furnace or stove grate. A Jahant.
Furnaces, air moistening device for hot air. G W Fiddrich.
Furnaces, shafts, chimneys, etc., construction of blast. W P Ingham.
Galvanic battery. M M Clark.
Gas burner. C H Robbins.
Gas engine. J and W Paterson.
Gas wells, method or apparatus for removing water or oil from bottoms of. R H Staley.
Gate. A W Macfarren.
Glass, apparatus for producing flat objects of. P Sievert.
Glove, catcher's. E L Rogers.
Governor, engine. C E R Martin.
Governor motor, engine. C E R Martin.
Grain conveyer. F E Duckham.
Grain conveyor, pneumatic. F E Duckham.
Grain elevator. F Kaucher.
Grain scouring machine. R W Welch.
Grate, water heating fire. J H Phillips.
Grater for culinary purposes. J Davidson.
Gun, breakdown. R C Fay.
Gun frame. R C Fay.
Guns, ejecting and cocking mechanism for breakdown. G A Horne.
Guns, ejector for breakdown. R C Fay and G E Humphreys.
Harrow, disk 2. J Macphail.
Heat magazine, refractory and non-conducting. C H Land.
Heater. C B Wamamaker.
Heating boiler. H C Steinhoff.
Heating furnace. C D Howard.
Hides, treating. D A Goodman.
Hinge, stop. G A McKenzie.
Hitching strap. J H Valteau.
Hoisting mechanism. G F Jennings.
Hook and eye. G S Pearson.
Horse boot. J Duffy.
Horse detacher. M M Benster.
Hydraulic elevator. J R Wade.
Invalid lifting apparatus. W E Goulding.
Kitchen cabinet. P L Ramsey.
Knives-to their handles, means for attaching. J Westby and J Whitfield.
Knob, door. C O Case.
Kraut cutter. W A Goforth.
Lace clamp, shoe. L D Craig.
Lace holder, shoe. G E Mongeau.
Lace, veiling, or ribbon holder. J M Schlesinger.
Lamp, electric arc. R Segerdahl.
Lamp shade, electric. E Vedovelli.
Lantern. T Langston.
Last. E J Howard.
Lens for optical purpose. C P Goertz and E van Hoegh.
Lock. C Swanberg.
Lock attachment. L L Bettys.
Loom shuttle guide. G W Farmer.
Lubricator. T J Hart.
Magazine camera. G P C Maroniez.
Manhole cover. C Parkins.
Manicure instrument. C J Bailey.
Match box. M Strekosch.
Maten making machine. E B Beecher and J P Wright.
Meat roaster. J Stroud. (Reissue.)
Mechanical movement. I S Bryant.
Microscopes, slow motion attachment for. H G Sedgwick.
Mixing machine. J Murkus.
Mold. E L Ransome.
Molding machine. C Herman.
Mole trap. A Arnold.
Monuments, construction of memorial. W B Van Amringe.
Motor. G W Brown and J W Little.
Motors, cylinder and valve for steam. A Holmgren.
Mowing machine. E Pridmore.
Nozzle. F W Herbkemann.
Nut and bolt lock. T Berridge.
Nut, axle. R Fawcett.
Nut for spindle supports, spring. E J Carroll.
Nut lock. F S Robbins.
Oar lock. H Brinkmann.
Ohmmeter. A H Amen.
Oil burner. J Dubelman.
Oil burner. C G Moore.
Oil burner. C Whittingham.
Open hearth furnace. J Purves.
Orange polishing machine. A Warr.
Organ. M Hetherington.
Oven, bakers. J Adair.
Package, are tight. A Roder.
Package carrier. E C Gipe.
Paper machine suction box. E Sanderson.
Photograph. H J Lloret.
Piano action. J R Perry.
Piano tuning hammer. B F Fuchs.
Piano cleaning apparatus. A C Mueller.
Pipe hanger. A J Beaton.
Pipe or rod coupling. S M Jones.
Placer machine. R L Chatterson.
Plait forming machine. C C Emmons.
Planter. J W Parker.
Planter and fertilizer distributor, combined. H Compton.
Plow attachment. M Culbertson and J J Burke.
Plow, rotary. L D Rail-back.
Power wheel. A J B Berger.
Powder wheel endless conveyers or elevators. A J B Berger.
Printed matter, producing copied effects on. C E Adamson.
Printing machine, rotary. J Michard.
Propeller, screw. W H Jay.
Propeller, vessel. S S Whippis.
Propelling apparatus. B Bernstein.
Pump. M W Hall.
Pump. H Jones.
Pump. E M McGee.
Pump. C C Worthington.
Pump governor, steam. J R Nixon.
Pump, rotary force. S C Shepard.
Punch, check. J C Robinson.
Punching machine. W E Bennett.
Puzzle. M W Brooke.
Railway, closed conduit electric. J F McLaughlin.
Railway, conduit electric. J L Horning.
Railway conduit system, electric. J B Linn.
Railway frog. C W Speckin.
Railway gripper, cable. R Brownstein.
Railway sanding device. C B Andrews.
Railway signal, electric 2. A J Wilson.
Railway signaling apparatus, self acting. G H Wood.
Railway supply system, electric. C H Harkins.
Railway switch. W H Santee and J E Ryan.
Railway system, electric machine for. F Deming.
Railway track. W R Smith.
Railways, closed conduit for electric. W E Stearns.
Ratchet mechanism. W H Young, Jr.
Register. C C Fields.
Revolver. O E Smith.
Rheostat. M Waddell.
Rod or pipe coupling, hollow. S M Jones.
Rolling apparatus. L D York.
Rotary engine. L Siverson.
Rotary trimmer. A J Vose.
Rubber and stocking, lumberman's. M D Girard.
Rubber articles, vulcanizing hard. H Trann.
Rubber type, method of and apparatus for making. L K Scottford.
Rubber or polishing machine. C S Yarnell.
Ruling device. J Grundy.
Sad iron. P C Greenawalt.
Sash balance. G Lusher.
Sash fastener. A H Parslow.
Sash lock. J A Hasenpflug.
Saw. J Danielson.
Saw filing machine. A J Neil.
Sawmill carriage. M Gox.
Saw safety guard, rip. G A Shields.
Scale, spring. M H Hausen.
Screen or sash fastener. M Hauser.
Scythe rack. D D Canble.
Seal lock. T Gaskins.
Seal or stopper, bottle 3. W Painter.
Seat and folding berth, combined. F Fraser.
Secondary battery. J E Rhett.
Separator. R W Jessup.
Sewer trap cleaner. L Beliveau.
Sewing machine for barring buttonholes. E H Harris.
Shade holder. N W Crandall and E A Russell.
Shaft, expansion. J C Coram.
Shipping or service box or crate, grocer's. R B Bain.
Sign. C F Webster.
Signaling apparatus for block systems, electric. M S Reiley.
Sink trap. H C Montgomery.
Skirt elevator. A L Zeller.
Skiing machine. J R Scott.
Slicing machine. J E Austin.
Snap hook. R C, H M., and L W Eldridge.
Solar energy, apparatus for utilizing. F H Monks and M L Severy.
Sole trimming machine. J B Emery.
Spacing nail. J J White.
Spreader rod. S D Poole.
Sprinkler. J B Haberle.
Staging bracket. J B Kenison and M F Burk.
Steam boiler. D Ahern.
Steam or hot water boiler. E Gurney.
Steam shovel or excavator. J B Webber.
Steel, decarbonizing. W K Topley.
Steering engine. M A Beck.
Steering gear, vessel. O Schleicher.
Stovepipe attachment. W Wilson.
Stovepipe thimble. W Biermann.
Structure, tubular underground. R L Harris.
Stud or fastening for shirt waistbands, etc. J Nadal.
Surgical cabinet and irrigating device. E M Lundholm.
Tableaux, vivant apparatus for displaying 2. E von Kilanyi.
Tawing hides. C Heinzerling.
Teaching vocal music, device for. M M Vogt.
Telegraph key. C F Sebring.
Telephone, mechanical. J Prince.
Tent 3. J J Rinn.
Tent fastening. J J Rinn.
Thermoset. D W Thompson.
Thill coupling. C Wilcox.
Thill couplings, antirattle for. M McKinnon.
Thrasher band cutter and feeder. M G Schauer and A A Bartlett.
Time recorder, workman's. D M Cooper.
Tire and wheel rim, pneumatic. P W Tillingham.
Tire, pneumatic. G F Stillman.
Toboggan, roller. C N Grant.
Toy bank, coin controlled musical. H W Porter.
Trolley catcher. W D Cobb.
Trousers or coat. G J Morse.
True. J B Randall.
Tug, hame. J C Clausen.
Turn table. C L Strobel.
Type writer inking ribbon. A T Brown.
Type writing machine. T Oliver.
Type writing machines, type cleaning brush for. F Van Fleet.
Umbrella, folding. D A Smith, Jr.
Valve, check. A J Caldwell.
Valve for gas burner, air. H Ruppel.
Valve operating device. C Otis.
Vehicle wheel. F and T F Mendenhall.
Vise. S Frisbie.
Vise, rapid acting. W C and W H Toles.
Wall. F Schweitzer.
Watchcase spring. C Nobs.
Weighing, registering, and discharging machine. L P Summers.
Wheel rim for pneumatic tires. T Birch.
Wheelbarrow. J B A Grenier.
Window. A Massalski.
Window appliance. E Kenser.
Window stretcher. S Allison.
Window stretcher. J E Crisp.
Wire tightener. C H Van Wagoner.
Wool washing machine. F G and A C Sargent.
Wrench. J L Stambauff.
PATENTS GRANTED NOV. 6, '94.
Adding machine. H D Hicks.
Advertising machine. W T Shirley.
Advertising purposes, construction of buildings for. E Nicolas.
Air brake. R W Bayley.
Amalgamator. H L Simmons.
Animal securing device. J W Ziellenbach.
Animal trap. W C Hooker.
Asphalt, preparing and utilizing rock. W A Adams.
Auger, double tenon. C Blatchley.
Auger, well. E E Seniff.
Ball making machine. M B Mishler.
Band cutter and feeder. I A Crisp and J A Stevenson.
Bark, etc, machine for removing. C E V Folin.
Barking machines, automatic feed for wood. W Hadley.
Barrel hooping machine. E A Delano.
Basket, ventilated fruit. C W Weston.
Basket, wood veneer made. C W Weston.
Bearing, antifriction. A J Shaw.
Bearing, ring oiler. W W Carey.
Bed, folding. H W Rn Ton.
Bedstead clothes rack adjustment. J P Edmonds and J A Kyle.
Beer, etc, apparatus for dispensing root. S F Kates.
Bellows for forges, etc. S Rucinski and F M Kozlowski.
Bicycle lamp holder. T Sanders.
Bicycles, adjustable handle bar for. R C Fay.
Binder for books or pamphlets. A J Rudolph.
Binder, temporary. J H Nellis.
Bird cage spring, duplex. A B Hendryx.
Boiler. B F Conner.
Boot or shoe. O P Hard.
Bottle, etc. D E Kempster.
Brake beam. D L Barnes.
Brake mechanism. J S Copeland.
Brake shoe. J O'Brien.
Brush. A E Magoris.
Brush, air. J S Overman and W T Woolston.
Brush, dust. H Z Ziegler and A I Wood.
Buckles, manufacture of sheet metal suspender. G E Adams.
Burglar alarm, electric. W A Brownell and J B Seagar.
Butter extractor, centrifugal. O Ohlsson.
Button or stud, cuff. C C Champenois.
Cabinet, revolving ribbon. J A N Lindsey.
Calipers, watchmaker's. G B Farrell.
Can making machine. R D Hume.
Can opener. F W Wright.
Car brake, railway. J R Cribbs.
Car coupling. J H Pearson.
Car coupling. J D Tunnell.
Car coupling, link and pin. J Wright.
Car, dumping. W G Lane.
Car fender and brake, street. J S Detrick.
Car motor, street. H S Park.
Car, railway. C H Barrows.
Car sand box. A Garing.
Carburetor. P Keller.
Carpet lining. C C Stewart.
Carrier. C P Hogue.
Cash register and indicator. J S Hilliard.
Caster, ball. J B Offerle.
Catalogue, card. A J Randolph.
Centerboard. H Voss.
Center mark tool, portable spring actuated. R S Peabody.
Chain, driving. W B Teale.
Chain making machine. P H Standish.
Charger. D P Allen.
Chopping knife. W L Pike.
Chuck, lathe. W Wolff.
Churn. O Ohlsson.
Cigar bunching machine. H K Gardner.
Cigarette slide and match box, combined. J T Crawl.
Circuit closer. H J Hovey.
Clamping device for machine tools. R S Peabody.
Clasp. J Stevens.
Clock, electric alarm. M McDonnell.
Clock, musical. H W Porter.
Coal and mineral washer. E Ramsay.
Coal screen. G F Blackeslee.
Coats, vests, etc, device for supporting. M F Koenig.
Cocks, stem connection for four way. R M Dixon.
Coffee hulling, scouring, and cleaning machine. D B Fraser.
Coffee pot attachment, adjustable. H P Dunning.
Collar and hames, combined horse. H Eckardt.
Combination lock. H Barditzky.
Combination lock. J Bois.
Confectionery, machine for molding. D M Holmes 2.
Continuous extractor. J Naylor, Jr.
Cooking and canning machine, vegetable. F A Olin.
Corn shock loader. H McPherson.
Corner brace. C R McGahey.
Crane. A J Shaw.
Crane, traveling. G W King.
Cultivator. J R Suter.
Cultivator tooth 2. C Maul.
Curd cutter. O Barnard.
Curtain stick and guide. G L Bailey.
Cutting tool. A Hunsley.
Cutting tool. W H Nelson.
Cycle steering lock. R F Hall.
Dish cleaner. W P Harrison.
Ditching tool. D C Peat.
Dividers. A Haff.
Door check or closer. C O Case.
Door controller, pneumatic. J W Gray.
Draining device. A D McGill.
Drawer lock. L C Brown.
Drying raw or prepared goods, apparatus for. A Rubenkamp.
Dumping incline. J O Wright.
Dyeing machine. M Bacon.
Electric apparatus, coin operated. J H Elfering.
Electric motors for operating machinery, utilizing. E Richter.
Electric switch. F G Belles.
Electrical connections, plug for establishing. C W Brown.
Electrical retoucher. C M Savage.
Electrical transformer. R M Hunter.
Electrically operated elevator. E Marshall.
Electrodeposition apparatus 2. H L Bridgeman.
Elevators and elevator gates, safety attachment for. I M Hill.
Embankments, machine for building. W G Price.
Embroidering machines, fabric moving mechanism for. J A Groebli.
Emery wheel, elastic. D B Hyde.
Engine. C F Sparks.
Engine attachment. P Chouteau.
Engine speed stop. B F Teal.
Evaporating apparatus. T Craney.
Excavating and hoisting bucket. G H Williams.
Eyelet for carriage and huggy curtains. D C Woolsey.
Fastener, corrugated. F W Starr.
Feed trough. A Greer.
Feed water purifier. M S Cabell.
Fence. R L Paris.
Fence. D W Thomas.
Fence, flood. J W Story.
Fence machine. O H Page.
Fence machine, wire. F H Daniels.
Fence post. S P Idings.
Fence, wire. H Buck.
Filing and binding news or other papers, device for. C Dickerson.
Filter and cleaning same. W A Freise.
Filtering apparatus. J A Bowden.
Fire engine and pump. C Ponce and C Lock.
Fireplace and grate, combined. E Scanlon and J Zipp.
Fish spear. H D Deshler.
Fish trap. B Wood.
Fluid pressure engine. G Dixon.
Fly paper holder. O and H Thum.
Form, bast. R A Guilan.
Fruit wrapping device. B Leonard.
Galvanic battery. M M Hayden.
Gas burner. P Keller.
Gas generators, oil feeding apparatus for. O N Guldin.
Gas lighting and extinguishing apparatus, time. A B Shaw.
Gases, closing receivers charged with compressed or liquefied. E tern.
Gas es, process of and apparatus for destroying noxious. R H Doud.
Gate. J M Hefner.
Gear, machine. H P Bradford and J A Smith.
Gear, reversing. G W King.
Gearing. J M Maret.
Gearing, chain. H Briggs.
Glass house pot or tank. W H Barr.

- Glass receptacle. C T Green.
Gold and mercury and making same, solution of. I Semenov.
Gun, magazine. L L Hepburn.
Halter. H Casey.
Hammer, riveting. R S Peabody.
Harness. J W Anderson and R S Twiss.
Harvesters, beet root or potato. L F Wautier.
Harvester elevator. O O Storle.
Hat. D Howell.
Hat bodies, apparatus for stretching felt. R Robinson.
Hay press. J F Adams.
Hay stacker. W C Dawes.
Hide shaving apparatus. G A Lawrence.
Hinge, shutter. D U Stoner.
Hoisting machinery 3. A J Shaw.
Hoisting machinery, electric. A J Shaw.
Hoisting machinery, switch operating mechanism for. A J Shaw.
Horse checking device. T H Shottenberg.
Horse checking or unchecking device. C C Wheeler.
Hose reel. J B Hunter.
Hot water boiler for heating purposes. T Brooks, M Reilly, and W Rudkins.
Hot water heater. J F Harrison.
Hydrocarbon motors, means or apparatus for effecting and controlling the supply of hydrocarbon to. J E Weyman and J A Drake.
Impounding debris and storing water, method of and means for. H W R Strong.
Inkstand. F B Pratt.
Inkstand. T S Shenton.
Insulating compound. O Stiles.
Ironing board attachment. R N Boston.
Keyhole guard. J A Giese.
Knitted undershirt. J Feldenheimer.
Knitting machine. L E Salisbury.
Knitting machine. O Wilson.
Knitting machine, automatic circular. B M Denny.
Ladder and guiding trolley therefor, step. W J Sumner.
Lamp, electric arc. A H Moses, Jr.
Lamp, electric arc. C E Ongley.
Last, metal. G C Pettis.
Leaf holder. J H Pendleton.
Leak alarm, electric. C C Kahne, A A Adkins, W S Peirce, J E Martin, and G F Kahne.
Letter box. C E Abbott.
Liquid containing vessel. J Thornton and A B Woodard.
Liquid mixer, shaker, and fruit squeezer. W H Payne.
Liquids, apparatus for centrifugal separation of compound. A Ponten, and J V Skoglund.
Lock for doors or moving vehicles. C A Wright.
Locomotive or other furnace. R H Brown.
Loom shuttle box operating mechanism. H Bardsley.
Loom shuttle tension device. J Sweeney and G Stroble.
Looms, self threading shuttle for. J H Nason.
Magnet. A H Hoyt.
Match safe. C H Renter.
Measuring electricity, apparatus for. W Friese-Greene.
Menu card and check, combined. J A Newberry.
Metal bars, union of transverse. J T McCormick.
Metal cutting machine, shape. L S Pfouts.
Metal, mechanism for handling molten. J S Dougherty.
Metal, process of and apparatus for forming and treating. G Engel.
Micrometer gages, automatic stop for. H V Bernhardt.
Mining drill. A E Buzzo.
Mop and wringer, combined. S L Bergstresser.
Nail making, distributing, and driving machine. F F Raymond, 2d.
Necktie holder. J H Hines, Jr.
Nozzle, automatic exhaust. J T McLellan.
Nut lock. W J Dillehay.
Oculist's testing frame 2. J H E De Celles.
Oil can. J Schwiebert.
Oven, reel. W W Higgins.
Packaging machines, tension regulating attachment, for fabric. E P and R W Watson.
Packing, piston rod. O J Ellis.
Packing powdered substances. J Barnewitz.
Packing vessel and method of preserving food articles. H Selzer.
Paddle wheel. W Craigie.
Padlock. W Smith.
Paper box. P Lindemayer, Jr.
Paper cutter. E J Jones.
Paper cutting and embossing press. B Karfiol.
Paper, process of and machine for enameling. A S Woodward.
Paper registering machine. T C Dexter.
Paper weight, pen rack, and calendar, combined. T F Cruiger.
Pawl and ratchet mechanism. A J Shaw.
Pen, fountain. H L Braham.
Penholder. R P Saffold.
Picture folding support or stand. D B Williams.
Plane. J A Traut.
Planter and fertilizer distributor. G W Ashcraft.
Planter, check row. E W Collins.
Planter, corn. W Ahlers.
Planter, corn. J A Dodd.
Plow. G W Whatley.
Plow, cultivator. H C Otten and A Kathmann.
Plumber's grappling tool. W Thomas.
Polishing articles of manufacture, apparatus for automatically. E L Carrington.
Polishing machine expanding cylinder. E S Everts.
Printer's metal furniture. F B Emery.
Printer's quoit. O A Amundson.
Printing machine. M Vierengel.
Protractor and bevel. T J Lumis.
Pulley blocks, automatic brake for. J W Powell.
Pulley, split. J F W Fawcett.
Pulp burial casket and making same. G E Shaw.
Pulp compression apparatus. G E Shaw.
Pump, combined steam and power. G de Laval.
Pumping apparatus for sprinkling systems. B L Stowe.
Punch machine, center. R S Peabody.
Purse, coin registering. M H Metal.
Puzzle or game. J A Kirk.
Pyroxlin compound and making same. R S Schnpphaus.
Race track leveling machine. W T Newport.
Railway. C F Laib.
Railway bond, electric. H B Nichols and F H Lincoln.
Railway electric switch. W V and J H Ash.
Railway frog. D Horrie.
Railway signal. F R Payne.
Railway signaling system. M Corrington.
Railway switch and locomotive attachment for operating same. W Holliday and T F Rawls.
Railway switch, automatic. J M Dixon.
Railway switch, automatic. C F Duval.
Railway track crossing frog. V N McGee and W M Mansfield.
Ratchet wrench. W G Orcutt.
Razor stop. H Bezer.
Refrigerator. R Brand and W Diekmann.
Rheostat. J C Fyfe.
Rheostat 2. A J Shaw.
Rheostat and heater. R C Mitchell.
Rolling mills, support for mandrel bars of tube. C G Larson.
Row boat. G Vogel.
Sash fastener. A A and C P Allen.
Sash fastener. F Burmeister.
Sash fastener. J H Dickson.
Sash fastener. J B Letourneau.
Sash fastener. T E Wardwell.
Sash lock. C A Robert.
Sashes or blinds, frame or casing for window. P McKenzie.
Saw, circular. J Little.
Saw set. J W Packard.
Scale, computing. H Paddock and O B Johnson.
Scale, weighing. W A Wheeler.
Secondary battery. E M Poston.
Separating machine, centrifugal. O Ohlson.
Setting machine. F Bean.
Sewing machine. P B Laskey.
Sewing on buttons, machine for. A Walrath.
Shatt hanger. F N Gardner.
Shoe. T F Marshall.
Shutter, window. D Pobst.
Sleigh. R W Walker.
Sleigh runner. H and J K Pangborn.
Slide and buckle, combined. D Carpenter.
Smelting titanite iron ore, method of and composition of matter for. J L Randall.
Sounding apparatus. C E Kirtland.
Sower, seed. J Minsgrove.
Spectacles or eyeglasses. J L Borsch.
Stall floor. W A and S G Brown.
Stamp, rubber hand. S D Arnold, J B Venker, and W L Barnard.
Steam trap. O Gasset.
Stools, wooden base for piano. P H York.
Storage battery 2. C J Reed.
Stove, gasoline. M W Palmer and C S Munro.
Stovepipe joint. J E Smiley.
Stovepipe ventilating attachment. A Bay.
Street sweeper. H Mueller, Jr.
Stump extractor. J C Sharp.
Suspender cast off. G E Adams.
Tablets, machine for the manufacture of compressed. L Thomas.
Tally register for grain measurers. C Snyder.
Tally table. F W Sowatsky and M Schimmeyer.
Telegraph and telephone system, combined municipal. H M Seitzinger.
Telegraphic and telephonic exchange system. W Childs.
Telegraphing between cars of railways, means for multiplex. A Fryer.
Telephone. W C and J M Lockwood.
Telephone exchange system. W Childs.
Telephony. F R Colvin.
Temperature regulator 5. T O Perry.
Testing machine. J H Kellogg.
Thill coupling. J Hienretty.
Ticket canceling apparatus. H B Sergeant.
Tobacco cutter. J H Hellings.
Tobacco moistening device. C N Swift.
Tonnage computer. G C Warren.
Tool handle, combination. W J Morrison.
Trace. G S Duffin.
Trap. F Lamplough.
Trolley catcher. A S Osborn.
Trolley line breaker. C H Dey and J M Anderson.
Trolley wire clip. J W Perry.
Truck, car. J C Barber.
Truck, hand. H O Thomas.
Trunk. H and J F Fuchs.
Twine holder. P C Schowalter.
Type, apparatus for automatically justifying. P F Cox.
Type setting machine 2. P F Cox.
Type writer copy holder. S L Conde.
Type writing machine. J N Williams.
Valve, engineer's brake. D L Barnes.
Valve gear, steam engine. H W Armstrong.
Valve mechanism, engine. C Schmid.
Valve, steam. R M Fryer.
Valve, syringe. H D Taggart.
Vehicle brake, automatic. J A Monnee and D L Delaney.
Vehicle wheel. F Myers.
Veneer articles, apparatus for molding. F Filip.
Vise. R S Peabody.
Vise. F A Pickering.
Waffle iron lever handle. C J Hess.
Wagon. M P Jacobsen.
Wagon brake. V T Sweeney.
Wagon sand band. J A Fulton.
Walls, construction of. L Kupper.
Watch alarm. J W Nunemaker.
Waterproofing compound. W H Browne.
Wheel. E D Misner.
Wheel. G Turner and J M H Venour.
Wheel rim joint vehicle. L Rastetter.
Wheel rim, vehicle. R A Gibson.
Whetstone. R Dutton.
Window. F C von Heydebrand und der Lasa.
Window cleaner. R G Mitchell.
Wrapping machine. C J Weinman and E E Enchenhofer.
Wrench and oiler, combined. T Tierney.
Yeast, manufacturing. A Myers.
- ### PATENTS GRANTED NOV. 13, '94.
- Acid, making salicylic. S Marasso.
Acid, manufacture of anhydrous stannic. I A F Bang and M C A Ruffin.
Air brake couplings, sealing cap for. H C McCarty.
Air brake regulating apparatus. H E Hunt.
Air draft control apparatus. H Becknagel.
Air inlet or draft doors, means for opening or closing. C A Gifford.
Aligning machinery, method of and apparatus for. R J Snyder.
Alloying lead and zinc. F J Clamer.
Amalgamator. C F Pike.
Amalgamator sluice box, automatic. H L Phillips.
Animal trap. C R Mead.
Annunciator, automatic set back. H C Thomson and G J Galbraith.
Ant trap. W B Carter.
Antirattler and shaft support, combined. E C Hall.
Armor plate, manufacture of. T J Tresidder.
Anger for boring and reaming. L F C Rich and J H Hull.
Baling press. F L Fobison.
Beehive super. G C Ferguson.
Bicycle. E Honan.
Bicycle alarm. J A Weaver, Jr.
Bicycle driving gear 4. D Lippy and L E Finckel.
Binder for leaves. G H Winslow.
Bleaching. H Thies and E Herzig.
Boiler. J Pierpoint.
Boiler furnace. J Lister.
Boiler furnace. W McClave.
Belting machine. C W Yost.
Bottle guard. C M Boscowitz.
Bottle, non filling. H I Leith.
Box. A M Galland.
Box or package. G P Cato, Jr.
Box wiring or hooping machine. E A Cooley.
Boxes, etc., corner stay for. H G and C Alexander.
Bridge, truss. J A L Waddell.
Bridges, roofs, etc., construction of. J E Greiner.
Bridle bit. E L Cruger.
Brush bridle, paint. C Boeckh, Jr.
Burglar alarm. P H Lindsey and C H Squires.
Button fastening machine, automatic. I J Saunders.
Cabinet and index file. I E Edgar.
Calendering machine. R Butterworth.
Can labeling machine. C R Frazer.
Can making machines, carrier for. R D Hume.
Can testing machine. D D Ranney.
Candle extinguisher. J Boyle.
Cap, pillow, and life preserver, combined. F Frank.
Car brake, railway. L Roberts.
Car coupling. A G Clark.
Car coupling. G Gladfelter.
Car coupling. G B Leonard.
Car coupling. M Mills.
Car coupling. G A Norcross.
Car coupling. G Soner.
Car, dumping. H H Brown.
Car dumping apparatus. J M Phillips.
Car fender. E B Graff.
Car fender. J McCarthy.
Car fender. F D Weber.
Car fender, street. H C Kennedy and G W Roletter.
Car heater. R M Dixon.
Car heater, street. M K Brown.
Car poling device, railway. W C Boswell.
Car, railway. G W Hancock.
Car safety guard. F Zorn.
Cars, reversible driving gear for. J Hopkirk.
Carpenter's work holder and guide. C Rainbridge.
Carper stretcher. J E Barnes.
Cash pitching apparatus. T J Reinhard.
Casks, apparatus for extracting residual substances from. E E Murphy.
Casket lid fastener. W C Langenau.
Casket lowering device. A C Richardson.
Casting crucible steel, apparatus for. C Capper.
Center board, boat. W R Eaker.
Chain attachment block, elevating or conveying. D Bennett.
Chlorin, obtaining. L Mond.
Cigar press. E J Fink.
Cigar tip cutter. F P Sparmakep.
Cigar vending machine. H L Kirtley.
Cigarette machine cutter. E T Pollard.
Cleaning and polishing compound. O I Littell.
Clock, alarm. T Bidding and T J Kane.
Clock, self winding electric. A Lungen.
Closet pull attachment. L M Hooper.
Clutch. D Bennett.
Clutch, friction. W R Smith.
Cock, blow off. W McIntosh.
Coffee pot. N G Bond.
Collar or cuff shaping machine. E G Smith.
Colter clasp. F E Davis.
Commode. E Leslie.
Conveyer. J Bulger.
Coop, metal folding chicken. I Zimmerman.
Coop, poultry shipping. J A Gilliland.
Cork husking machine. M Young.
Cotton band cutter. L S Gardner, G Cook, and A O Tannenbergh.
Cotton chopper and cultivator, combined. R J Brown and J E Register.
Cover and trit jars or other vessels. C N Brady.
Cream separator, centrifugal. W C Hartman.
Cultivator 2. J F Packer.
Current electrodynamic machine, alternating. M Huttu and M Leblanc.
Cutting machine. F Wilcox.
Damper, etc., stove. N D White.
Dental articulator. J W Anderson.
Ditching or grading apparatus. E P Fox.
Door closer. F R Bauer.
Draft equalizer. A McDonald.
Drilling machine. D Jones.
Drills, etc., adjusting device for. W J Mewer.
Drills, rotary support for hand. J W Duff.
Drop lights, canopy for counterweight. A Zempliner.
Drying cylinder for textile machinery. W C Mackinney.
Drying frame. A C Sharpell.
Dumping cage. J N Wright.
Dye, manufacture of yellow and orange. F Muhlert.
Ear muff. I B Kleinert.
Egg case. H C Herr.
Egg fillers, machine for making. H E Herr.
Electric conductor conduit. J Tatham.
Electric cut out, automatic. D F Sweet.
Electric instruments, binding post for. E A Lowe.
Electric machine, dynamo. R Thury.
Electric machine regulator, dynamo. J Ferrand.
Electric roads, underground conduit for. E E Mathers.
Electrical conductors, sheathing. J Tatham.
Electrical cut out. D F Sweet.
Electrical transformer. F S Culver.
Electrical transformer. F Zickernann.
Electricity, means and apparatus for distributing. H T Harrison.
Electrolytes, method of and apparatus for circulating liquid. P Schoop.
Electromagnetic machine. G J Scott.
Electrotype plates, making. J W Naughton.
Elevator. L M Johnson.
Elevator safety device. W P Kidder. (Re-issue).
Elevator ways, automatic safety guard for. J Kobos.
Elevator well gates, device for operating. C F De Arden.
Engine stopping apparatus. N E Nash.
Extension table. H G Schnarr.
Fancet register gage. A W Meyer.
Felly joint, wheel. W F Morton.
Fence. J C Fraser.
Fencing, machine for making barbed wire. E S Lenox.
Fertilizers from waste lyes, obtaining. L Tralls.
File, bill. O Hlossfeld and P Kussner.
File, paper. J B McEnally.
Fire alarm system, automatic. H S Tunnard and A M Keays.
Fire engine lighter. C W Enos.
Fireproof furring, partition or wall. B E J Ellis.
Floor, ceiling, etc., fireproof. T L Banks.
Flour, mechanism for testing and recording properties of. J Hogarth.
Fruit sizer. H C Jones.
Fuel, apparatus for manufacturing artificial. G Konow.
Fulminating compound. H Maxim.
Furnace. F A Jones.
Furnace grate. J H Meissner.
Furnaces, grate for boiler or other. W McClave.
Furniture and collapsible table, combination article of. A W Ellison.
Game apparatus. L Wyler.
Game counter. A Folger and W H Winder.
Game table for soap bubbles. E E McNaughton.
Garbage treating apparatus. C A Ball.
Garment securing device. O Van Oostrum.
Garment stretcher. L Mallory.
Gas apparatus, water. O N Guldin.
Gas burner. S P Essex.
Gas burner. C Whittingham.
Gas lighter, electric. C G Savage.
Gases, recovering iodides, chlorides, or other salts from blast furnace. P Gredt.
Gate. S J Smith.
Glass, apparatus for the manufacture of ornamental sheets or plates of. J W Bonta.
Glass, lecr or annealing oven for sheet or plate. J W Bonta.
Gold extracting apparatus. J B Hannay.
Governor, fluid pressure. L L Cutler.
Grain binder. E E Davis.
Grain drill heads, changing gear for. T A Hill.
Grate. A Bryce.
Grate, dumping. E Fales.
Grinding and polishing machine. M H Reynolds.
Grinding and pulverizing cylinder. R F Abbe.
Gun, magazine. M C Lisle.
Hame. H C Brookens and L Bohringer.
Hammer, magazine tack. F R Bischoff.
Hanger. L Laue.
Harness attachment. G Beck.
Harrow disk sharpener. J A Cass.
Heating apparatus. J Hinstin.
Heating furnace, air. S L Wiegand.
Heating liquid by means of steam, apparatus for. D B Morison.
Heating system, hot water. L G Allen.
Hinge. A Riley.
Hinge, lock. W Hegenscheidt.
Hose coupling. J Dester.
Hot water furnace. F A Gardner.
Ice machine. W L Church and S A Reeve.
Ice making apparatus 4. W L Church.
Ice making apparatus. W L Church and S A Reeve.
Ice making machine. W L Church and S A Reeve.
Ice, means for preventing air bubbles in. E W Richter.
Inhaling cabinet. R E Lee.
Iron or steel, process of and apparatus for the manufacture of. R M Hunter.
Ironing machine. S A Pratt.
Jewelry setting. Z A Oppenheimer.
Keyhole guard. M A Linder.
Knob, door. C A Lindholm.
Ladder apparatus, fire. H L Goodwin.
Lamp, electric. J Brockie.
Lamps, counterweight for suspender. A Zempliner.
Liquids, apparatus for driving off volatile constituents from 2. W T Walker.
Litter. R Ortega.
Lock. C B La Belle.
Loom, pile latric 2. H Wyman and G Poole.
Loom shuttle box operating mechanism. L H Downing.
Lubricator. W H Hunt.
Lumber stamping attachment for sawing or trimming machines. J P Rieley.
Magnet, electro. C C Gerlach.
Mail crane. M J Grasz.
Measuring and registering apparatus, train. C A Gilds.
Measuring device. C W Schraun.
Measuring machine, rope. C E Mathers.
Measuring tank. J Hall.
Meat chopping machine. J W Farnoff.
Meat cutter. O D Woodruff.
Milk sterilizing apparatus. I Leslie.
Milling machine. B F Barnes.
Miner's pick. T J S Hute.
Mold, parallel. F L Stone.
Motor power engine. J Landry and G Bynron.
Mowers, grass catching attachment for lawn. C K Hann.
Napkins, etc., holder for. J H Pierrepont.
Nut and bolt lock. G L Rush.
Nut, lock. N Leiden.
Office indicator. H G Klenze.
Oil can. A W Knittel.
Oil cloth, plant for the manufacture of. G Templeton.
Orange cup and pulp remover. H Maier.
Ore washer or concentrator 16. C F Pike.
Ore washing, concentrating, and amalgamating system. C F Pike.
Packing compound for thermometers. J Zorn and F G Luchesi.
Padlock, permutation. C H Wood.
Paint, composition of matter for. C L C, M W H, and A M H de Bruycker.
Paper box. E E Pinkerton.
Paper feeders, side registering mechanism for. G Sague.
Paper hanging apparatus. W W Davis.
Paper, method of and machine for separating and feeding sheets of. H Bradshaw.
Paper mill. F W Wilcox.
Penholder. E L Brown.
Photograph, coin controlled. F S Church.
Photographic prints, machine for mounting. J W McCabe.
Pianoforte and agraffe therefor. F B Long.
Pile driving apparatus. C McDermott.
Pipe wrench. M H Riza.
Pipes, device for thawing ice from. I H Simpson.
Pitch board. W E Frasier.
Placer machine, dry. H W and M Watson.
Planimeter. E J Willis.
Planter. J R Norcott.
Planter check row attachment, corn. A V Biggs.
Planter, corn. H H Gunner and F G Shirley.
Planting machine fertilizer attachment. L A Aspinwall.
Plastering compound. A W Smith.
Plow, hand garden. W C Gillmore.
Pneumatic tired wheel. H W Verdon.
Polishing machine. E Berglund and A Renterdahl.
Potato digger. C H Hall.
Power transmitting device. J Evans.
Pulley. F Gier.
Pulley, sash. W R Fox.
Pump screen cleaning attachment. E A Richardson.
Race track. D B Stevenson.
Rail chair and tie, combined. J Albrecht.
Rail joint. M C Niles.
Railway electric switch. C M Fitch.
Railway gate and signal, automatic. E Death.
Railway rail. A F La Shells.
Railway signal 2. G P Adams and J S Lynam.
Railway switch. J U Butcher.
Railway switch. B F Longmiller.
Railway switch. H Polis.
Railway switch, electric. R A Bahlwin.
Railway tracks, intersecting electric. M Lowd.
Reflector and shade, lamp. G H Bliss.
Refrigerator or butter cooler. O M Whitman.
Roach trap. S P Burgess.
Rocking chair. G C H Kaltwasser.
Rocking chair. T W Wigg.
Rolling mill. S V Huber.
Root cutter. O E Thompson.
Rotary cutter 3. J Ettinger.
Rotary engine. O E Morse.
Saddle, harness. J A Miller and J H War-moth.
Sanding device. T J Thomas.
Saw guide, drag. G M Mize.
Saw gummer or sharpener. J E Oglesby.
Saw handle. M M Cope.
Sawmill buffer. E E Thomas.
Scale, automatic grain. C H Cooley.
Scale beam and poise for testing machines. C E Buzby.
Scale, price. C W Smith.
Screw cutting die. J Hartness.
Seal. E J Brooks.
Semaphore operating apparatus. J S Lynam.
Sewing books. J T O Orloff.
Sewing machine. M T Denne.
Sewing machine table. T Kundtz. (Reissue).
Shades, holding device for spring actuated. J A Lidback.
Shaft hanger. W Bynon.
Sharpening device, razor. P J Caesar.
Shirt. T H McDonald.
Sign, luminous. W Hoskins.
Signal operating wires, compensator for 2. J S Lynam and G F Adams.
Signal replacer. W R Sykes, Jr., and J P O'Donnell.
Signals, electrical apparatus for controlling. S S Bogart and M B Leouard.
Signaling system, train operated. J H Fischen.
Sliding gate. D Fulton.
Smokers use, article or accessory for. R S Peabody.
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Stamp sticking or sealing machine. J T Shaw.

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Steam elevator. R J McCarty.
Steam or other fluid boiler. L P Perkins.
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Sterilizing apparatus. G Popp and H Becker.
Stove. W J Keep.
Stove. A A Ruby.
Stovepipe punching machine. C Eshliman.
Strawboard bending apparatus. T Remus.
Street sweeper. M Mueller, Jr.
Street sweeper. A G Rosenhauer and R Brussel.
Stump extractor. J C Smith.
Sucker rod adjuster. D M Edmonds.
Suction pipe for suction devices. C F Pike.
Sulky. W H C Diessel, W O and E D Foote.
Sulky, trotting. H A Pennock.
Surgical splint. H A Weed.
Swing. S I Alston.
Switch. C Hansel.

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Tire, bicycle. E S Frazier.
Tire, bicycle. E Granert.
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Truck. J D Grabill.
Truck, car. B F Manier, Jr.
Tube expander. W M Bullock.
Turnstile gate, coin controlled. O H Williams.
Turnstile register actuating attachment. O H Williams.
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Type writing machine. C Spire.
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Wire netting machine. G F Wright.
Wire rolling apparatus. P Schrader.
Wire stay weaving device. E H Stowell and G W Terry.
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Wooden rim, band, etc. S Elliott.

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Bowling alley. M Knollmuller.
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Car coupling. H W Taylor.
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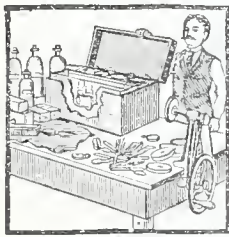
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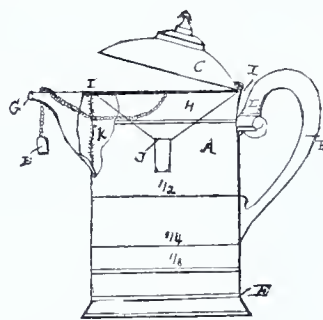
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Other assets (secured).....	12,110 25
Cash on hand.....	140 94
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LIABILITIES.	
Paid-up and prepaid stock.....	\$ 1,426 37
Special deposits.....	35,446 80
Monthly stock receipts.....	14,683 29
Weekly dues receipts.....	26,734 51
Loans repaid.....	10,666 58
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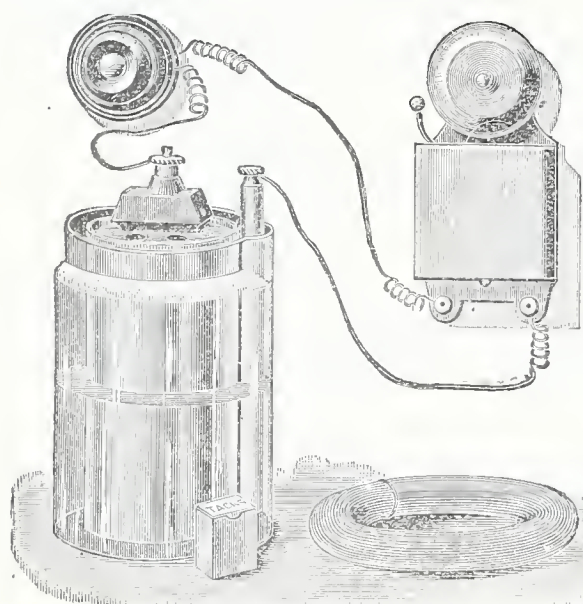
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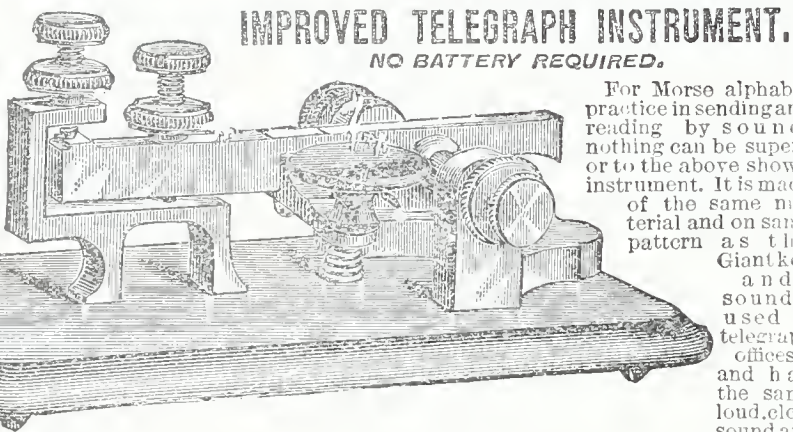
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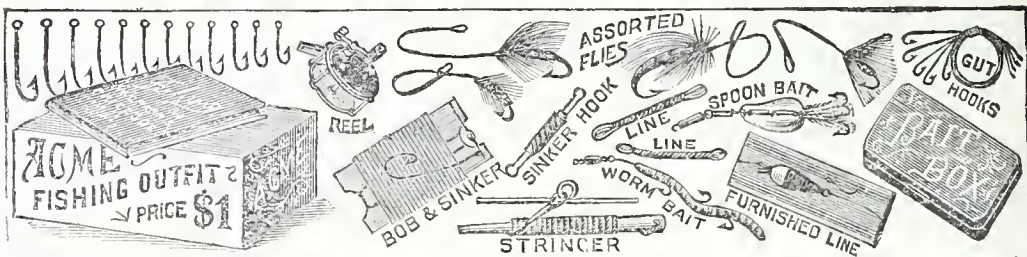
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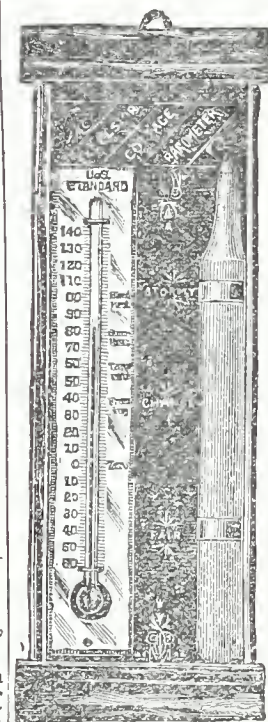
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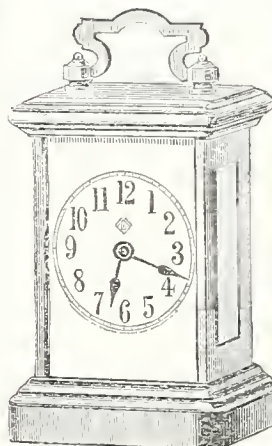
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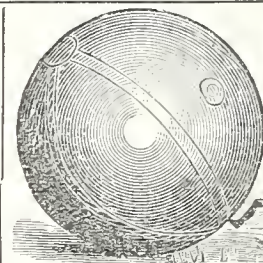
THE "MIDGET" CLOCK.



Our "Midget." Works of Ansonia make. Case nickel plated, glass sides, drop handle, constructed on the same style and shape of carriage or traveling clocks, which are sold for \$3.00 each. It is universally admired for its shape and design being modeled after French patterns so long popular and sold at high prices. It is a perfect little gem and in offering it to our patrons at price named we feel that we are giving them a rare opportunity. Its size is 3 in. wide 1½ in. deep and 3½ in. high. Packed in wood case. Postage

10c. Price \$1.25 Each.

Add 50 cents for "Inventive Age" one year.



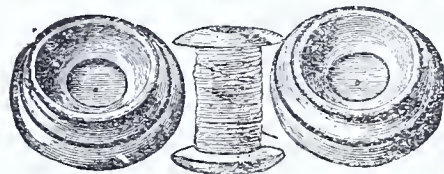
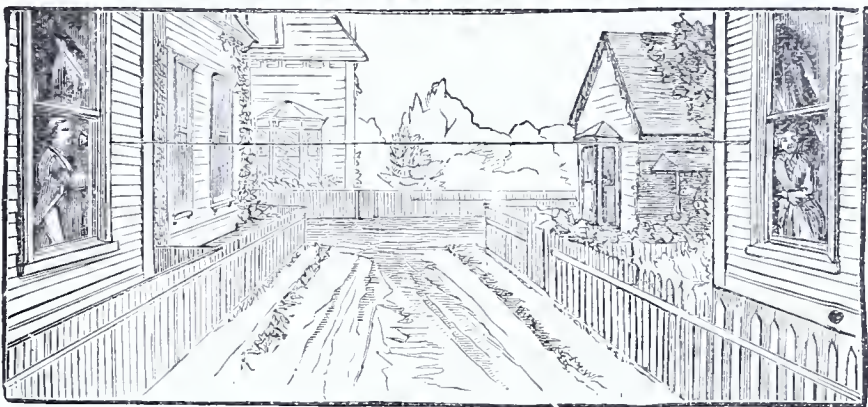
FOOT BALL THE GREAT AMERICAN SPORT.

The popularity of Foot Ball as an out-door sport is increasing, and with good reason, as it is a most invigorating and strengthening exercise. Running, which it so largely involves is known to be the best possible exercise. We have arranged with one of the largest rubber companies to supply us with a special ball for our trade at very low prices in large quantities. We sell 3 sizes only. They are made of strongest canvas, rubber coated. Warranted durable and perfect and the best foot ball made. Note our very low prices:

5 inch diameter, \$1.00 Each; Postage \$0.07
7 " " 1.40 " " " .09
9 " " 1.80 " " " .14

Add 50 cents for "Inventive Age" one year.

A PRACTICAL TELEPHONE.



Cheap Enough for a Toy, and Good Enough for Practical Use.

This simple little instrument is sure to meet a general want in supplying the place of Speaking Tubes and Electric Bells, at less than one-quarter of the cost. One of its principal recommendations lies in the readiness with which it may be put into PRACTICAL use in connecting separate rooms in the same or adjoining buildings, such as Manufactories, Shops, Stores &c. It has been thoroughly tested, and its satisfactory working, together with the low price at which it is offered, must insure its general use. Complete directions for setting up, also 200 feet of Composition Wire, accompany each Telephone. All packed complete in wood box. Extra wire for Telephone 35 cents per 100 feet; each 100 feet on spool. This telephone is warranted to work for a distance of 1,000 feet, if put up according to the directions accompanying each box.

Postage 20c. Price \$1.00 Complete; \$10.00 Doz.

Add 50 cts. for "Inventive Age" one year.

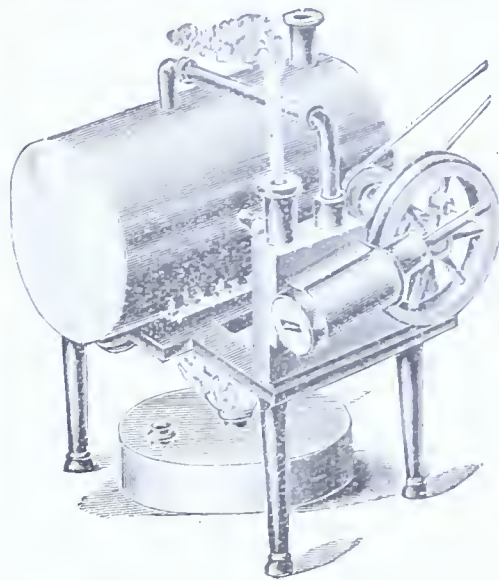
BURGLAR ALARM.



Is it worth anything to know that your door is closed against the smartest sneak thief every night? This Alarm will give you that feeling of security. He may pick or break the lock, but he don't open the door without setting off the Alarm. Its simplicity accounts for its low price and its value. It winds like an Alarm Clock and is closed into any doorjam without injury to woodwork. When the door opens it drops, suspended by string, and goes off with loud ring. Postage 5c. Price 68c. Each. \$7.20 Doz.

With "Inventive Age" one year, \$1.50.

VICTOR STEAM ENGINE.

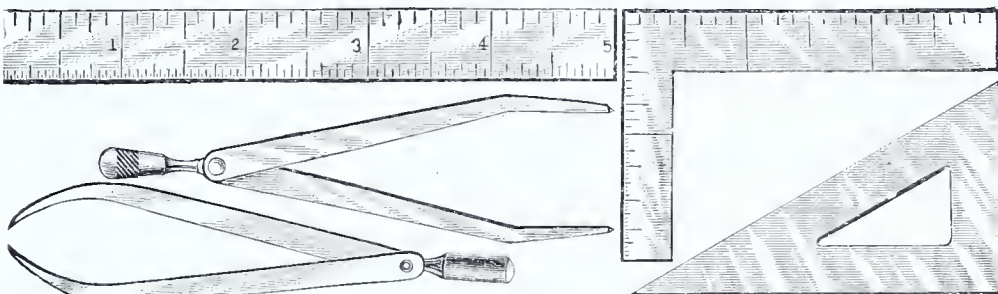


This Engine is a perfect beauty, which our cut exactly represents, everything about it shines. Boiler is nickel; Frame enamelled; Balance-wheel turned bright and true. It is a new design and made on the best plan for durability and power. It is put up complete with lamp and instructions for running. Postage 8c.

Price 60c. Each. \$6.25 Doz.

With "Inventive Age" one year, \$1.50.

NICKEL-PLATED STEEL TOOLS.

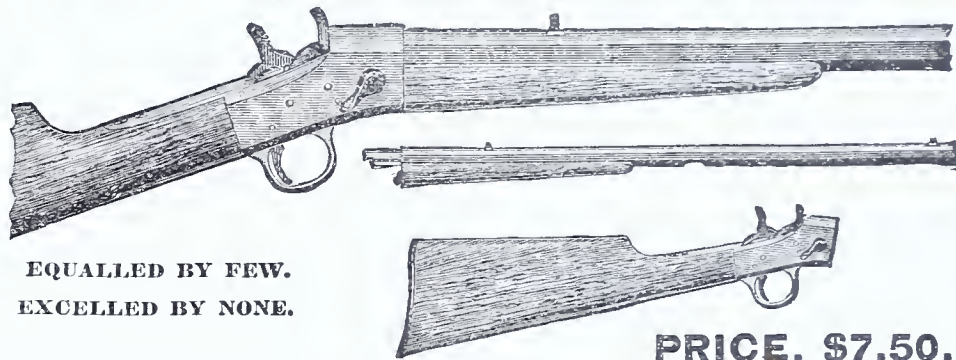


These articles are made of the finest steel, polished and plated in the best possible manner and are for all practical purposes equal to similar goods sold in stores at five times the price. The well known high prices of such goods, has induced us to manufacture them in large quantities and to furnish them at prices at which every one can afford to buy. They are useful in the house and indispensable in every office and store. In fact no one should be without them.

By mail, 15 cents each; \$1.20 per dozen. Set of 5, 60 cents.

With "Inventive Age" one year, \$1.

THE "NEW YORK CLUB" RIFLE.



EQUALLED BY FEW.

EXCELLED BY NONE.

PRICE, \$7.50.

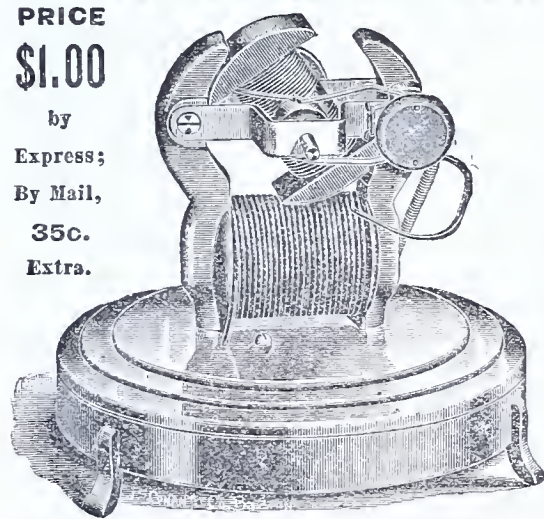
Indorsed and adopted by the New York rifle clubs. Is made in three calibres, 22, 25 and 32. It has automatic shell ejector, black walnut stock, with case hardened mountings and locks, 24-inch barrel, rifled by the most skilled workmen. The "New York Club" Rifle is made by the Crescent Arms Co., whose foreman superintends the manufacture of this rifle was formerly Inspector of Arms for the Army, knows how a good gun should be made. By an ingenious device this rifle can be taken apart and put together instantly, without any tool. It weighs but 5 pounds, and can be packed in a trunk for traveling. We claim for the "New York Club" Rifle unequalled beauty, finish, convenience, accuracy and strength. It is a fine specimen of American science and workmanship. All parts are interchangeable. It was with a 22 calibre "New York Club" Rifle that Prof. Russell won the Gold Medal at Hamburg by breaking 20 clay pigeons in succession. The "New York Club" Rifle is powerful in its shooting capacity, as may be judged from the facts that Robert Morris, a young man in the Adirondack regions, was one day last Fall squirrel shooting with a "New York Club" Rifle, using 22 cartridges; a huge deer sprang across the path from some underwood, about seven rods away. Young Morris leveled his rifle at the creature's heart and fired. The beast gave three bounds and fell dead, shot clear through the heart. Rifle shooting is the most royal sport of any shooting, and every town should have a rifle club. Price of the "New York Club" Rifle: In round barrel, \$7.50; octagon barrel, \$8.00. One price for all calibres. State which wanted. If \$1.50 is sent with order, will send balance C. O. D. When all cash is sent with order, will include a box of cartridges. In no case will cartridges be sent with C. O. D. orders.

The "Inventive Age" one year, free to the purchaser of the above.

THE DOLLAR ELECTRIC MOTOR.

PRICE
\$1.00

by
Express;
By Mail,
35c.
Extra.



constructed on correct mechanical principles with all the parts of a large Edison motor, including Armature, Commutator, Magnets, nearly 100 feet Insulated Copper Wire, Adjustable Brush Holder and Brushes, and Pulley for transmitting power. This Outfit also includes Battery and Chemicals for renewing same. Packed in strong wood case.

Postage 35c. Price, \$1.00 Each.

Add 50 cts. for "Inventive Age" one year.

POCKET DRINKING CUP.



Everyone who travels much or little will appreciate this. The cup though large enough when drawn out to hold nearly as much as a tea cup; when closed fits into the case which is the size of a gent's watch. The cup is made of German silver and will not corrode or rust, while the case is finished equal to the most handsome silver watch. Postage 3c.

Price 22c. Each; \$2.00 Doz.

With "Inventive Age" one year, \$1.

LADIES' SOLID SILVER CHATELAIN WATCH.

This watch is called the "Daisy," and the name is most appropriate. The case is of solid silver, beautifully engraved, and it has a silver cup over the works to protect the movement. It is a stem-winder and setter, and has a really excellent movement. We guarantee it to keep first-class time. A handsomer little watch you could hardly find at any price. It is not gaudy or showy, but extremely neat and attractive. It does not look like a cheap or tawdry watch. We guarantee it to give perfect satisfaction. Let every lady who does not already own a watch avail herself of this great bargain, and let every gentleman who wishes to make, to wife, sweetheart or sister, a handsome present, think well before he lets this opportunity pass. Postage 5c. (If registered 13c.) Price \$4.95 Each.



With "Inventive Age" one year, \$5.

SPRING BALANCE SCALES.

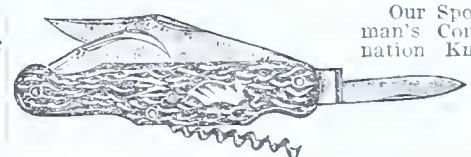


Spring Balance. An old favorite. Will weigh anything under 24 pounds. The best quality yet produced. Elegantly finished and accurately made and sealed off. Great value! Postage 6c.

Price 12c. Each; \$1.28 Doz.

With "Inventive Age" one year, \$1.

SPORTSMAN'S KNIFE.

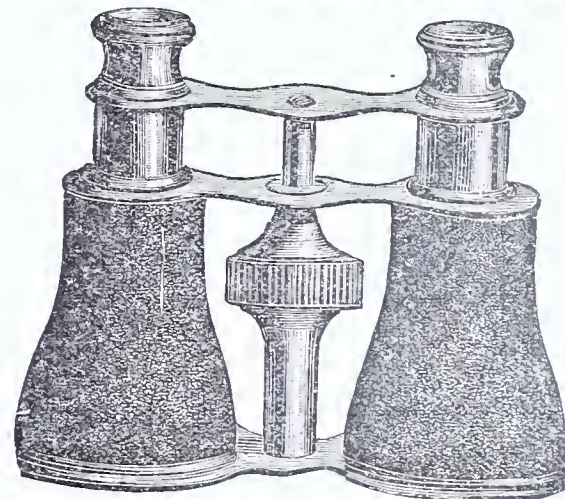


Our Sportsman's Combination Knife.

Genuine heavy stag handle with three blades, one large clip blade, one medium, one short and one curved, all in finest crocus polish, also has corkscrew, milled scales, brass lined, German Silver shield, one of the handsomest and most durable knife we have ever offered. Postage 5c. Price 95c.

With "Inventive Age" one year, \$1.75.

FRENCH FIELD GLASS.



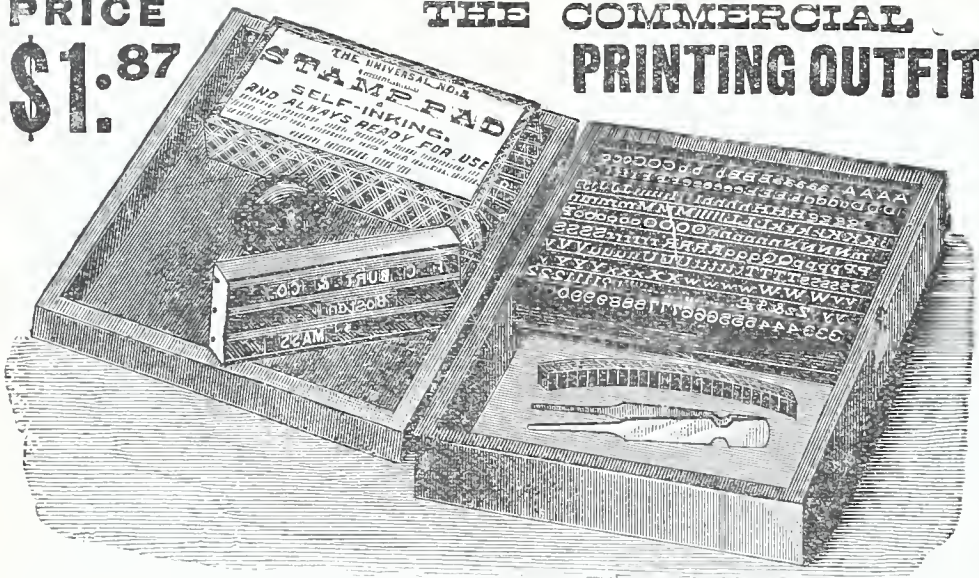
High power field glasses have hitherto sold at prices placing them almost beyond the reach of persons of moderate means. The glasses we now offer are just what the people want, reliable glasses at low prices. Farmers, herdsmen, hunters, prospectors, sailors, travelers, tourists, and, in fact, everybody, will find them invaluable. Farmers and herdsmen can see their cattle or sheep miles away. Hunters can distinguish game at great distances, and by this means not give warning of their approach. The tourist can bring distant mountains, valleys and cities almost at his feet, while any one with these field glasses will soon become familiar with different objects that before (from their great distance) he knew nothing of. Friends and acquaintances can be recognized at great distances, and a pair of these field glasses will prove both instructive and amusing to every one. They are strongly made and cannot get out of order, but will last a lifetime. There is not a man, woman or child that cannot find use for them almost every day of their life. They are the regular standard size binoculars, elegantly covered in leather, with powerful lenses, handsome black eye pieces, and nicely nickel plated metal barrels and frame, with thumb screw extension so as to vary the focus to suit one's eyes. The glasses are enclosed in a dark leather case, lined and having a hinged cover, fastening with a strong spring lock, holding them securely when not in use. They will be found very useful at concerts, the opera, and other entertainments, bringing the performers and singers up to close range of vision. In fact a pair of these field glasses is a necessity, and at this specially low price, every one can afford to purchase. Each pair of glasses in a handsome leather case.

Postage 10c. Price Complete, only \$1.90 Each.

With "Inventive Age" one year, \$2.25.

PRICE
\$1.87

THE COMMERCIAL
PRINTING OUTFIT.



This OUTFIT is made to supply the want for a first-class business outfit. It contains about 12 Alphabets of Type, (5 A 7a), a three-line holder, self-supplying Ink Pad, Tweezers, Quads, etc., and will do a much larger variety of work than any of the smaller Outfits. For addressing Envelopes and Shipping Tags, it is specially adapted, while it is equally useful in doing hundreds of other jobs which would otherwise go to the printer or require an expensive rubber stamp. In fact, it may be used in any ease where a one, two or three line stamp is required. Extra holders can sometimes be used to good advantage, which we furnish at 20c; each for 1 line, and 10c. for each extra line. Below are shown the styles and the work that may be done with them. No. 10 is more condensed and contains a larger number of letters than No. 9, which is a broader and plainer letter. Postage, 18c.

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STYLE No. 10.

CHARLES BENDIXEN,
102 South St.,
New York City.

INDISPENSABLE TO EVERY BUSINESS MAN, AN OFFICE OUTFIT THAT IS CHANGEABLE AND ALWAYS BEFORE YOU

Add 50 cents for "Inventive Age" one year.



"Ignorantia legis neminem excusat."
LAW AT A GLANCE,
OR EVERY MAN HIS OWN COUNSELOR.

Is a new epitome of the Laws of the different States of our Union and those of the General Government of the United States, and will be found invaluable to those who are forced to appeal to the law, as well as to that large class who wish to avoid it. The whole is alphabetically arranged so as to make reference to it easy.

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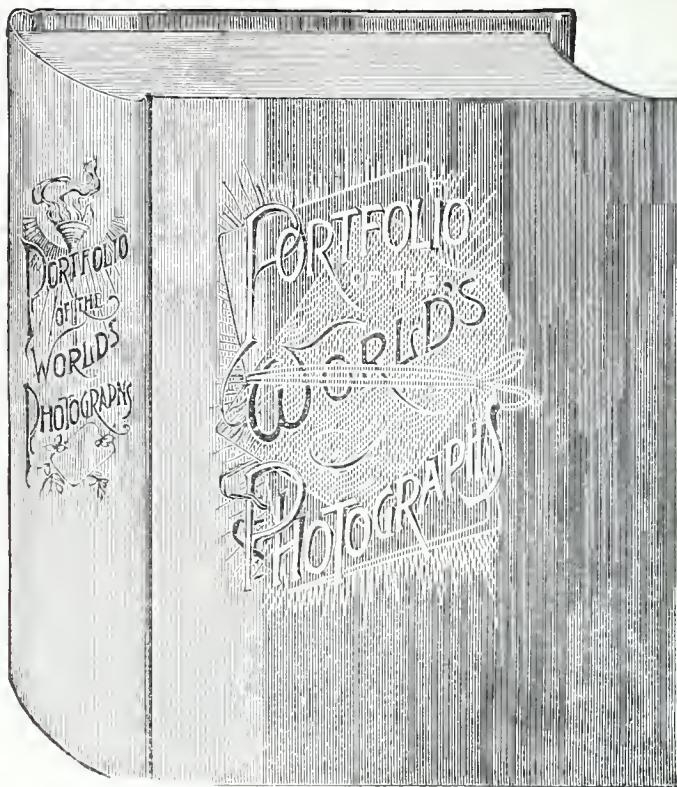
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THE WONDERFUL, CURIOUS, AND BEAUTIFUL!

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A grand panorama of the world from creation to the present time. Presenting to view pictured scenes of famous battles in the world's history, buried cities, mysterious ruins, gloomy prisons, ironing towers, feudal castles, great battle-ships, cathedrals, mosques, churches, obelisks, famous parks and fountains, beautiful lakes, bewildering and awful mountain scenes, magnificent cities, celebrated sculpture, famous paintings, Works of art from imperial galleries, scenes from the Holy Land, tropical forests, imposing and costly buildings, triumphal arches, mausoleums, monuments, statues, caves, caverns, canals, including Portraits of the World's most Famous People, authors, artists, poets, sculptors, musicians, politicians, bankers, millionaires, judges, actors, actresses, presidents, kings, princes, members of the royal families, men who ruled the world, showing their homes and scenes in their lives.

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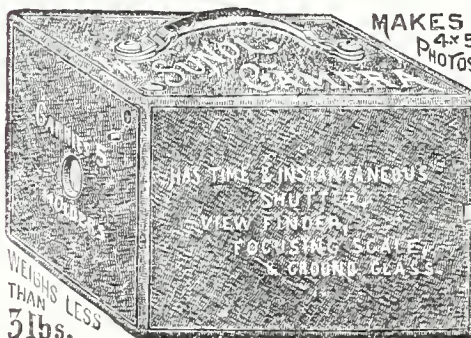
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BREAKS ALL RECORDS.

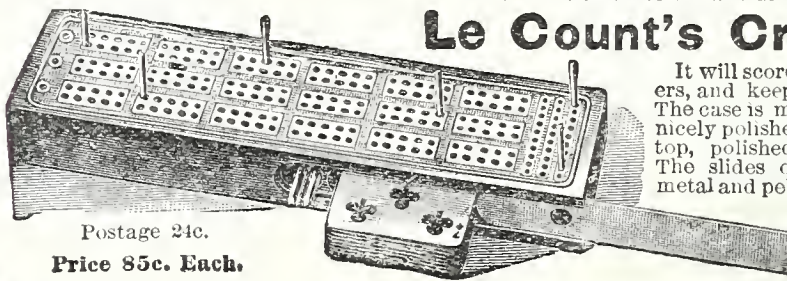


MAKES 4x5 PHOTOS
This is a perfect working Hand Camera; having all the advantages and improvements of the higher priced Cameras. It makes a 4x5 Photograph and is the lightest and most compact Camera made; weighing less than three pounds. A photograph can be made without opening the case, as the Camera can be focussed. Shutter both set and released from the outside. If wanted for time exposure it can be placed on a tripod or stand and an exposure of any length of time can be made by simply working the Shutter. This is just the Camera for "Snap Shots." Light, compact and effective, it is a favorite with tourists. Made after the pattern of the high priced Detective Cameras and practically as good; better than some, as with the "Sunol" Outfit you can do your own developing printing and finishing cheaply and with dispatch. One second takes a perfect landscape or portrait with the "Sunol." It can be carried under the arm and photographs of your friends taken without their knowledge, when they are talking, laughing, etc. You can produce the finest pictures for but a few cents per dozen including negative. It has a fine Single Lens, View Finder, and "Barnett" Holder. The "Sunol" is provided with one Holder at the list price, but will hold five. No. 1. Handsomely Polished Walnut Finish with 1 Holder, \$5.00. No. 2. Covered with Black Seal Grain Leather, with 1 Holder, \$7.50. Extra Holders, Single 75c; Double \$1.00 Each.

Developing and Printing Outfit for "Sunol" consisting as follows: 1 doz. 4x5 Dry Plates, 1 Developing Tray, 1 Fixing Tray, 1 Ruby Lamp, 1 package Developer, 1 lb. Hypo Soda, 1 4x5 Printing Frame, 2 doz. sheets Blue Process Paper. Not available. Price \$3.00.

Add 50 cents for "Inventive Age" one year.

Le Count's Cribbage.



It will score for three or six players, and keep tally of the games. The case is made of black walnut, nicely polished; has a solid metal top, polished and nickel plated. The slides of compartments are metal and polished. This Board is superior to Boards that sell for three times the price. Full directions with each Board.

Postage 24c.

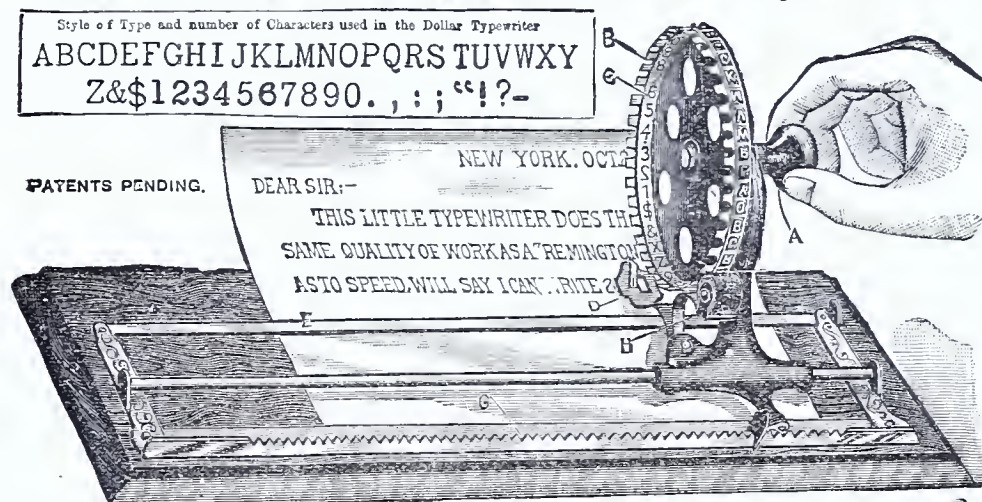
Price 85c. Each.

With "Inventive Age" one year, \$1.60.

THE DOLLAR TYPEWRITER.

A PERFECT TYPEWRITING MACHINE.

Price only \$1.00 by Express; \$1.15 by Mail.

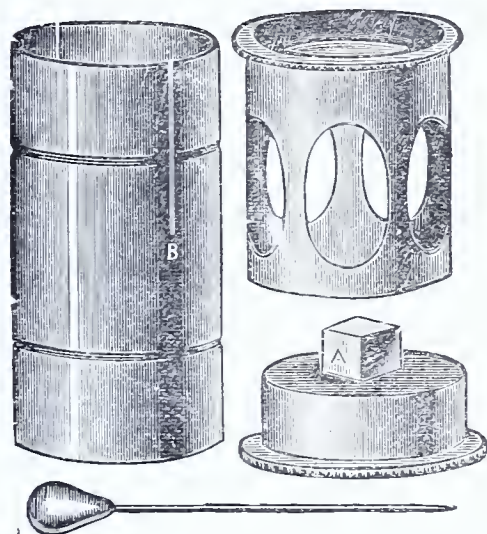


The Dollar Typewriter is a complete machine as shown in cut. It has 46 characters of type the same as that used on a Remington. It is provided with numerous patented devices for inking the type, holding the paper, spacing and governing the impression and alignment. It will write a postal card, note or full letter sheet and is particularly well adapted to addressing envelopes. It is a practical illustration of what a rare combination of ingenuity, skill and capital may do as it embodies many difficult and expensive mechanical movements which were heretofore only possible in high priced machines. Over a **QUARTER MILLION** of these machines have been sold within the last year and the secret of its great success is that the manufacturers commenced with a foundation of original ideas and then spared no expense in putting them to practice by the use of the best machinery to be devised. If no more could be said of it this Typewriter is worth many times its cost as an instructor of children teaching and amusing at the same time, but its features of practicability commend it to the use of nearly everyone and the sale it has had and will have is not surprising. It is a **PERFECTLY CONSTRUCTED** machine that will do work equal in quality to any of the high priced machines. It is so **SIMPLE** that a **CHILD CAN OPERATE IT** and will not get out of order. It is **LIGHT** and **PORTABLE**—just the thing for travelers. It is very **ATTRACTIVE** in appearance, made entirely of metal, mounted on a highly polished hard wood base. It will **WRITE RAPIDLY** with practice—15 to 25 words a minute. We **GUARANTEE** every claim for it, and if not as represented **REFUND MONEY**. The **PRICE** is but **ONE DOLLAR!** This is the age of typewriters, and no one should be without one.

Any typewriting that may be done with any of the high priced machines, from \$100.00 down may be done with this one. It is now possible for **EVERYONE** to own a Typewriter and address and write their letters, postals, etc., in the same way the richest firms do theirs. The monopoly in Typewriters died when "THE DOLLAR" was born. Postage 15c. **Price \$1.00 Each.**

With "Inventive Age" one year, \$1.75.

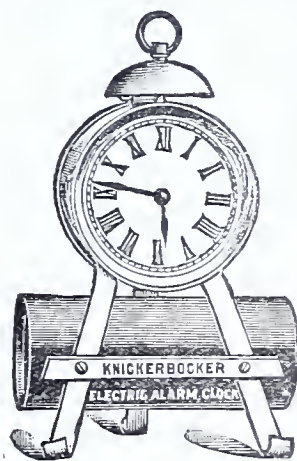
COMBINATION MICROSCOPE.



Scientific skill and the greatest perfection in workmanship coupled with a very high magnifying power, distinguish this handsome microscope over all others ever offered at popular prices. It is specially imported from France, and readily sells for one dollar at retail. As regards power and convenience of handling, good judges pronounce it the best ever introduced for popular use. The cylindrical case is manufactured from highly polished brass, while there are two separate lenses—one at each end of the microscope. The larger glass is a convex magnifier, adopted for examining insects of various kinds, the surface of the skin, the hair, fur or any small articles. It will magnify the hairs on the hands or arms till they resemble large ropes, and it is a most interesting companion. The other lens is exceedingly powerful, and will clearly delineate every small object, entirely invisible to the naked eye such as the animalcules in a drop of water, fishes, feathers and the minutest insects. An interesting illustration of its great power may be had by placing a drop of sour flour paste upon the bottom of the lens, when on looking through the eye-piece, the sight of the writhing mass of thousands of worms, snakes and eels, is one never to be forgotten. Thousands of living animalcules can be seen in a single drop of stagnant water. An insect's eye is a very beautiful object when seen through this microscope. It reveals hundreds of small eyes or six sided facets resembling net work or honeycomb, which enables the insect to see in all directions without moving its head. There are 4,000 of these little eyes in the single eye of a fly. It is invaluable in detecting adulterations in food, such as flour, tea, coffee, sugar, spices, milk and the fatal trichina spiralis or pork worm. Postage 15c. **Price 47c. Each.**

With "Inventive Age" one year, \$1.35.

ELECTRIC ALARM CLOCK.

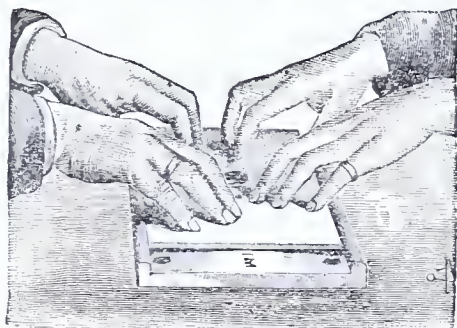


Clocks with attachments for bringing an electric circuit into action are not new, but their application has been in connection with more or less elaborate apparatus, chiefly burglar alarm work, where they are used to connect and disconnect the battery at certain hours. The cut shows an ingenious clock with dry cell battery, which can be used in combination with the mechanical alarm attachment, or separate, as desired. It is intended to

take the place of the old-fashioned mechanical alarm clock which, with its few seconds' ring, is the best that has been done up to this time. The great difficulty with old fashioned alarm clock is the short duration of the alarm, and here is where electricity steps in. The Knickerbocker clock is set in the usual manner to ring at a certain hour, and the movement of the clock throws into circuit a vibrating bell which will ring continuously unless switched off. The clocks are good timekeepers and richly nickel plated. Not mailable. **Price \$3.90 Each.**

With "Inventive Age" one year, \$4.

GENII OR TALKING BOARD.



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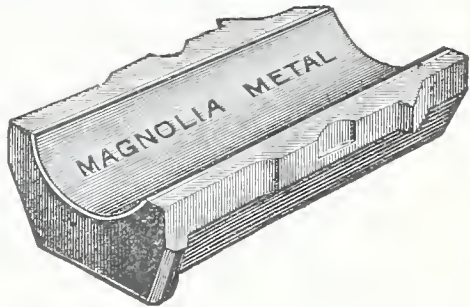
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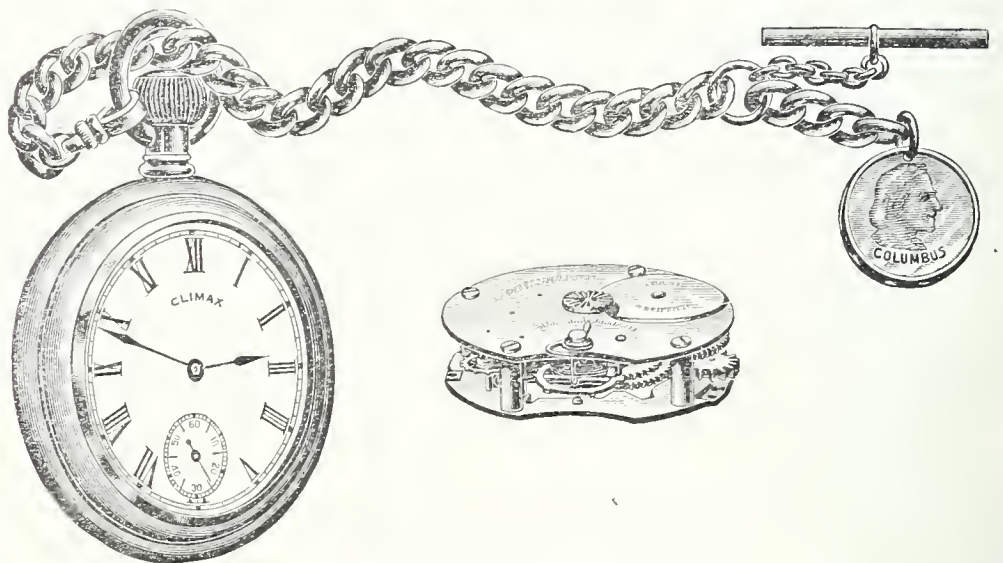
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